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PROCEEDINGS.

EVENING MEETING, Monday, 17th July, 1933.—
The Vice-President (Mr. J. Nebe) occupied the chair, and 26 members were present. Miss N. Booth was elected an ordinary member of the Club.

Reports on the excursion to Ashgrove were given by Dr. E. O. Marks (Geology) and Mr. Jack (Birds).

A lecture was delivered by Mr. S. T. Blake, B.Sc., on the "Cyperaceae or Sedges of the Brisbane District." Mr. Blake illustrated his remarks by a large series of very well mounted specimens of these plants.

Mr. J. Nebe exhibited specimens from Molle Island of Gorgonia, and lantern slides of trees planted by him about thirty years ago in the Nanango district.

Mr. J. E. Young exhibited some very fine slides of the common "goanna," and gave interesting notes on the life and habits of these animals; also photographs of trees from the Upper Albert River.

EVENING MEETING, Monday, 21st August, 1933.—
The Vice-President (Mr. G. Jackson) occupied the chair, and 28 members were present. Dr. G. Oakley was elected a country member of the Club.

Reports on the excursion to Castra were given by Mr. J. E. Young (General), Mr. K. Jackson (Botany), and Messrs. Barker and Jack (Birds).

A lecture on Corals, illustrated by lantern slides, was given by Mr. H. A. Longman (Director of the Queensland Museum). A few fossils from Cracow were exhibited by Miss Williams and commented on by Mr. H. A. Longman.

WILD FLOWER SHOW AND NATURAL HISTORY EXHIBITION, Saturday, 9th September.—
The Annual Wild Flower Show and Natural History Exhibition was held on Saturday afternoon and evening, 9th September, in the Albert Hall. During the afternoon Her Excellency Lady Wilson visited the exhibition, and was escorted round the wild flower tables and other exhibits by the Hon. Secretary (Miss E. E. Baird) and the Assistant Government Botanist (Mr. W. D. Francis).

Flowers were received for exhibit from Miss Estelle Thomson (Rochedale), Mr. J. C. Smith (Rochedale), Mr. J. E. Young (Glen Lamington), Mrs. and Miss Clarke (Brisbane), Mrs. Grant (Ormiston), Mr. and Miss Davies and Mr. Shirley (Bribie Island), Miss Makepeace (Tewantin), Col. Goadby (Townsville), Mr. B. D. Grimes, Miss Latimer and Miss M. Birt (Southport), Mr. D. Curtis (Upper Albert River), Mr. H. Curtis (Tamborine Mt.), Mesdames Slaughter, Robinson and Giffins and Miss Cook (Granite Belt), and Mr. C. T. White (Brisbane).

A very beautiful display of Australian wild flowers was sent by Mr. Burdett, of Basket Range, South Australia, from his garden of native flowers.

Western Australian native flowers from cultivated plants were staged by Mrs. Baird, Mrs. Curtis, and Mrs. Stafford. Some very fine spikes of *Dendrobium speciosum* were shown from the gardens of Mrs. Powell (Brisbane). A flowering spike of a rare variety (var. *gracillimum* *Dendrobium speciosum*) was shown by Mr. G. E. Young.

The State School Competition attracted nine entries. Prizes were awarded to Howard and Landsborough (North Coast), Russell Island (South Coast), and Thulimbah (Granite Belt). The competition for decorative effect was won by Misses Henderson and James.

In the General Natural History Section, exhibits were tabled by the Department of Agriculture and Stock (Economic Entomology), the Queensland Museum (Coloured Corals), Mrs. J. H. Simmonds (Shells), Mr. Macdonald (Shells), Miss Williams (Fossils), and Mr. N. Jack (Paintings of Birds). A fine donation of coral was received from the North Queensland Naturalists' Club.

In the photographic section, photographs of birds, animals and wild flowers were staged by Mrs. H. Curtis (Tamborine Mt.) and Messrs. Harvey Bros. (Mackay).

Special thanks are due to the University for the loan of tables, to the Director of the Botanic Gardens (Mr. E. W. Bick) for the loan of pot plants, and to the various members who helped in arranging tables, etc.

EVENING MEETING, Monday, 16th October, 1933.
—The President (Mr. F. A. Perkins) occupied the chair and 38 members were present.

Lecturettes were delivered by Mr. D. S. A. Drain on "Song Birds and Sentiment," by H. G. Barnard on "The Disappearance of Our Birds and the Causes Thereof," and Mr. G. H. Barker on "The Structure of Birds."

Exhibits were staged by Mr. N. Jaek (nest of wee bill), by Miss Williams (piece of ribbon stone from Mt. Isa, iron stone from Black Mountain, and lava and ebony from Ravenshoe, and by Mr. J. E. Young (kangaroo jaw and snail shell).

EVENING MEETING, Monday, 20th November, 1933.

—The President (Mr. F. A. Perkins) occupied the chair, and 32 members were present.

A general report on the excursion to Colmslie was given by Mr. J. E. Young, and notes on the birds observed by Miss E. E. Baird and Mr. G. H. Barker.

A series of lantern slides of scenery on the Bunya Mountains, of orchids from the Bunya Mountains, of Christmas Bells from Tin Can Bay, and of natives at the Barambah Station was shown by Mr. J. Nebe. Lantern slides of grass trees from the Bunya Mountains, and showing exceptional growth were shown by Mr. J. E. Young. Exhibits were staged by Mr. C. T. White of a Gaillardia showing fasciation, grown in the garden of Mr. J. F. Bailey (Brisbane); by Mrs. E. N. Williams and Miss Williams of native orchids; by Miss Baird on behalf of Mr. Ken. Baird, "stiek" of *Cactoblastus* eggs on prickly pear cladode and caterpillar (*Lymantria reducta*) from white cedar (*Melia*). These specimens were commented on by the President (Mr. F. A. Perkins), who also spoke on specimens of a wasp and its unusual nest, and a specimen of *Psychopsis mimica* shown by Mr. J. H. Simmonds.

Mr. Perkins further exhibited specimens of *Anaphasis*—the White Travelling Butterfly—taken at Gatton, and appealed to members to make observations on the speed, direction, etc., of these migratory butterflies at any time they saw a swarm.

OBSERVATIONS ON THE DISAPPEARANCE AND PROBABLE CAUSE, OF MANY OF OUR NATIVE BIRDS IN CENTRAL QUEENSLAND.

(By H. Greensill Barnard)

In making Central Queensland the portion of Australia on which my notes are based, is because I have spent many years there, and know the great changes which have taken place in the last fifty or sixty years. Probably greater changes have taken place in other parts, but those which caused many birds to disappear from Central Queensland will apply to those other parts.

Away back, in the years from 1870 to well into the

'eighties, there were good seasons. In those times there were numerous large creeks, fifty and sixty miles in length, heading away back into high ranges, where many springs helped to replenish the water supply. These creeks were mostly a chain of large, deep waterholes, covered with purple water lilies. Round the holes grew large paper-bark or *Melaleuca* trees, their drooping branches overhanging the water. From the ends of these branches that rare little honey-eater, "*Gliciphila fasciata*," suspended their large domed nests, composed of shreds of paper-bark.

Away from the creeks were large swamps which were practically permanent, and for the greater part of the year were covered with tall rushes. These swamps were the home of thousands of waterfowl. All kinds of ducks, cormorants, ibis, spoonbills, herons, native companions, bald-coots, coots, grebes, and many other smaller birds, such as landrail and crakes, bred there.

Land birds, too, were numerous. In the long grass on the flats near the creeks, finches, such as the plum-head, chestnut-breasted, zebra, or chestnut-eared, were in hundreds. The good seasons caused the trees to bloom freely, and there were nearly always some kind in bloom.

Honey-parrots screeched and fought in thousands in the eucalypts, while honey-eaters of many kinds added their voices to the din. As the seeds ripened on the eucalypts, large flocks of Banks' black cockatoos feasted on the nuts.

In those days the bush was a babel of bird notes. Sit beside a small waterhole anywhere, and observe the numbers of birds coming to drink. One was never lonely in the bush, there was so much of interest.

Now this is all changed. Gone are the large flocks of birds, and in their place only odd specimens (or none at all) will be observed.

What is the cause of this calamity? We have not far to seek. There are two main factors—"Man, and Nature." Of these two factors, I think we must place man first; or should I say "civilized man," for man interfered with nature. You are all aware that when the first white man landed in Australia it was peopled by blacks. All over Australia they were divided into groups or tribes, and each group had a certain amount of territory over which to wander in providing for their needs. To go beyond their boundary meant death. Therefore it was essential the tribe was limited to a certain number, and means were taken to prevent over population. What

those means were I need not enter into; they have no bearing on the bird subject. It is sufficient to say they kept up the balance of Nature. With the advent of the white man the native rapidly decreased, and so we started to upset the balance. We introduced flocks and herds, we ringbarked millions of acres of forest trees, and cut down thousands of acres of rain forests, thus destroying not only the shelter for birds, but also the food for billions of insects on which the birds fed. Small wonder our birds found it hard to exist.

On top of all this, we introduced Rabbits, and then scattered poison broadcast.

Still not satisfied, we let loose the fox and domestic cat, animals of destruction of which Australia had no parallel.

The herds of cattle and sheep fed down the grasses till they completely killed out many of the best kinds, thus destroying the food of the flocks of seed-eating parrots and finches, also quail and pigeons.

By making pads (miles in length) going to the water-holes to drink, the earth washed into the swamps and water-holes till they gradually silted up, till now, in all those fine creeks and swamps there is not a drop of water left. Stock are now watered in troughs, from dams and bores.

Think of it, where there were hundreds of miles of water-holes teeming with fish, weeds, and insects, now dry beds of sand.

I have given a few instances of how the white man upset conditions in Australia, there are many others. Let us now see what hand Nature had in aiding the destruction. In 1883, 84, and 85 disastrous drought conditions occurred, and from then on the seasons became drier. "The months of January, February and March, our normal wet season months," became drier and drier till the rain in those months practically ceased. These conditions culminated in the disastrous drought of 1901 and 1902. The timber on miles and miles of forest and scrub land died, and one could ride all day without seeing a tree with a green leaf. The ground was quite bare, even the roots of the grass appeared to have gone. Birds died in hundreds, no in thousands.

When the rain fell in December of 1902 hardly a bird remained. Some of the species never returned to those parts. In 1903 copious rains fell, and as there were no stock left, the grass made a wonderful recovery and seeded freely. As a result many birds from the far

Northern and Western parts made their appearance. They nested freely and remained for nearly two years, then disappeared almost as suddenly as they came, just as suddenly disappeared the little squatter pigeon, a bird that had always been plentiful in those parts. Inquiries all over Queensland failed to locate them. A few weeks ago I had a letter from my brother, C. A. Barnard, of Coomoolaroo Station, telling me that while mustering stock his men had flushed a pigeon from its nest in the grass. On investigating my brother found the bird was a squatter pigeon. The nest contained four eggs. As two eggs are a full setting, did two birds lay in this nest, or was the bird doing double duty to try and again increase the species?

1901 and 2 are not the only years in which I have seen birds die from starvation. During several dry, cold winters I have seen many birds dead, and others so weak they could not fly into the trees.

I have read somewhere, that when Nature created man, she created a terrible "misfit" in the universe, and it seems as if it were so. Not one man in a thousand cares a jot about our feathered friends, "except those he can eat."

All over the world birds are disappearing before so-called civilization, and science is called on to find means to destroy the hordes of insect pests which threaten to destroy our crops and herds.

Work that could easily have been accomplished by the birds, did we not so ruthlessly destroy them.

I suppose such things are to be. But it is a terrible pity.

I have mentioned the disappearance of the squatter pigeon. For the benefit of those who do not know what a squatter pigeon is like, I will give a brief description. It is a small, compact bird, with brown back, mottled brown and white face and cheeks, and greyish white breast. The flesh is white and delicate, therefore they were much sort after for the pot. It is essentially a ground bird, generally found about cattle camps in small flocks. Gets the name squatter from its habit of "squatting" from danger, and will allow one to ride or walk almost on top of them before they rise with a loud whirr which is very unpleasant when one is riding a nervous horse.

In a drought like that of 1901 and 1902, when so many birds died, one would expect these little pigeons to have suffered badly, but, strange to say, for a year after the drought they were plentiful and lots of nests

were found in the long grass. Then quite suddenly they disappeared. Could the cause be placed to the fact that, at the time of their disappearance the country was overrun with domestic cats gone wild, also a plague of the so-called "Native cat," "Dasyurus? These latter were in such numbers I poisoned forty in one month.

Soon after the pigeons disappeared the cats vanished.

We made numerous inquiries, but the replies all were the Squatter pigeons have gone. What causes these sudden disappearances? Take the immense flocks of the Western Flock pigeon. They suddenly disappeared, and they had thousands of miles of country in the interior where there were few whites and no stock to disturb them.

Yet it is only recently a few have again appeared in the West.

Perhaps if the good season's return the birds may again increase, but I am afraid we have reached the stage when the birds will keep on decreasing, and only imported ones, such as the starlings and sparrows, birds that have adapted themselves to the civilised conditions, will increase.

NATIVE ORCHIDS AT THE WILD FLOWER SHOW—SEPTEMBER, 1933.

By Geo. H. Barker.

One of the most pleasing features of this year's Wild Flower Show was the wealth and variety of the display of our Native Orchids, both terrestrial and epiphytcal. It has been a good year for these plants and those of us who have specimens in our gardens of *Dendrobium speciosum* (the common "rock lily") have noted how well they have flowered this year as compared with former occasions. There seems to be some cycle in the lives of these plants that is responsible for these good seasons, of their flowering, but whether it is just a matter of weather or not, it is impossible to say. This year the same good season has been apparent in the bush, for the early blooming *Caladenias* and *Pterostylis* were in greater profusion in certain localities known to the writer than was the case last year at any rate. Judging by the quantity of *Duiris*, *Caladenias* and *Prasophyllum* sent from Fraser Island it must be a veritable garden just now, and no doubt the botanist would have found other species in

or near the same localities. At least two species of *Dendrobium* have been noted there by the writer, and three species of *Peterostylis*. Col. Goadby was good enough to send some beautiful specimens from the North of which *D. undulatum* was the most noteworthy, others having suffered in transit. Mr. Young was responsible for a curiosity in the shape of a flowering stem of *D. Speciosum* var *gracillimum* which is a very attenuated form that was definitely recognised in 1929. Curiously enough many species common to the Brisbane district which are usually seen at our Show were not in evidence on this occasion. Had these appeared the list would have been a record. Appended is a list of those appearing in the different collections.

Phalaenopsis, Rosenstromii; *Dendrobium, speciosum*; *Dendrobium, speciosum* var. *gracillimum*; *Dendrobium, Kingianum*; *Dendrobium, tetragonum*; *Dendrobium, teretiafolium*; *Dendrobium, linguaeforme*; *Dendrobium, undulatum*; *Dendrobium, superbiens*; *Dendrobium, monophyllum*; *Dendrobium, aemulum*; *Diuris, punctata*; *Diuris, aurea*; *Galeola, Cassythoedes*; *Caladenia, alba*; *Caladenia, earnea*; *Glossodia, major*; *Prasophyllum, australe*; *Prasophyllum, brevilabre*; *Caleana, major*; *Thelymitra, ixioides*; *Calochilus, campestris*; *Lyperanthus, suaveolens*, *Mierotis, porrifolia*; *Ptersostylis, Baptisti*; *Peterostylis, nutans*; *Geodorum, pietum*.

Part XI

THE EUCALYPTUS OR GUM TREES OF THE BRISBANE DISTRICT.

By C. T. White, Government Botanist.

(Continued from the "Queensland Naturalist," Vol. VIII., p. 81.

20. *Eucalyptus crebra* (Narrow-leaved Ironbark).

Description.—Large tree with a hard, usually very deeply furrowed, black bark, the furrows and cracks usually carrying a dark red kino or "gum." Branches pendulous. Coppice shoots slender, at first angular but soon becoming terete. Coppice leaves linear-lanceolate to narrowly lanceolate, $2\frac{1}{2}$ -5 inches long on a slender petiole of $\frac{1}{4}$ to $\frac{1}{2}$ inch long, and from less than $\frac{1}{4}$ inch to $\frac{1}{2}$ inch wide. Lateral nerves and intermediate veins more or less plainly discernible on both faces; lateral veins 1—2 lines apart but not always clearly separable from the intermediate veins and reticulations; intramarginal vein very close to the edge, sometimes scarcely separable from the slightly thickened margin of the leaf



Eucalyptus crebra (Narrow-leaved Ironbark), Gatton

Photo—C.T.W.

itself. Ordinary (secondary or adult) leaves straight or falcate, lanceolate to linear-lanceolate; apex shortly acute; petiole or leaf-stalk $\frac{1}{2}$ —1 inch long; blade 3—5 inches long, $\frac{1}{4}$ to nearly 1 inch broad; lateral nerves and intermediate veins more or less clearly discernible on both faces, lateral nerves 1—2 lines apart, arising from the midrib at an angle of 45 to 60 degrees; intramarginal vein in the broadest leaves up to 1 line from the edge, in the narrower leaves so close as to form a slightly thickened margin to the leaf itself. Flowers in umbels, the umbels often arranged in small terminal panicles; individual umbels 3—7 flowered; peduncle angular, from slender to moderately stout, mostly about $\frac{1}{4}$ inch long; calyx tube angular, 1 line long on a distinct, rather slender, pedicel up to 2 lines long, less frequently gradually merging into a stouter, shorter pedicel; operculum conical, 1 line or slightly less in height. Stamens in several series (all fertile?), outermost filaments 2 lines long, innermost ones only about half this length; anthers very small, dehiscing by pores but the pores developing into wide open slits. Seed capsules obovoid, truncate or less frequently turbinate, $1\frac{1}{2}$ to nearly 3 lines in diameter, 4—5 celled, valves sunk or slightly exerted when open.

Distribution.—Eastern Australia from the Port Jackson District and Blue Mountains (New South Wales) to North Queensland. It is essentially a dry country species, and on the coast favours dry, siliceous ridges. In Queensland it finds its greatest development in a comparatively narrow strip 50—150 miles inland.

Common Name.—Narrow-leaved Ironbark is the generally accepted local name of the species.

Botanical Name.—*Eucalyptus* (see under No. 1); *crebra*, Latin meaning thick, crowded together or full of, referring to numerous flowers.

Timber.—One of the most extensively used of Queensland hardwoods. Like *E. paniculata* it is in especial demand where great strength and durability are required.

Botanical Reference.—*Eucalyptus crebra* Ferdinand von Mueller in Journal of the Linnean Society, of London, Vol. III., page 87, 1850.

BOOK REVIEW.

“Giants and Pigmies of the Deep.” A story of Australian sea denizens. By David G. Stead. Shakespeare Head Press, Sydney, 1933. 108 pages and numerous illustrations. Price, 2/-.

This is the fourth of an excellent nature study series issued by the Shakespeare Head Press, and the publishers deserve great credit for making available small, popular, and reliable books at a reasonable price.

Mr. Stead can lay claim to be a general naturalist, but his speciality is the study of fishes and other marine life.

This book is divided into fifteen chapters. The first four deal with life in the sea in a general way. The remaining eleven chapters are each devoted to a group of fish or other sea denizens, e.g., whales, dolphins, sharks, swordfish, mackerels, eels, etc.

A copy of the book should find its way into every school library, and teachers, particularly in coastal localities, could take excellent lessons from its pages.

AN IMPORTANT PAPER: A REVIEW.

"The Origin, Classification and Organic Relationships of the Protein Produced by Inorganic Ferruginous Material." By W. D. Francis, Brisbane, 1933. 15 pp. and 1 plate.

In June, 1932, Mr. W. D. Francis, who is Assistant Government Botanist, Brisbane, read a paper before the Royal Society of Queensland, outlining the experimental production of protein by inorganic material. This was published in the Proceedings of that Society in 1933. A continuation of the investigation has yielded significant results, so important that a fairly comprehensive review of the author's further work is given herewith. The present paper summarises three phases of Mr. Francis's work. The first deals with the location of the protein-producing reactions in the ferruginous material. In the second phase the relationship of the protein-producing experiments to the living activities of the iron bacteria is elucidated. The third phase is concerned chiefly with the classification and organic relationships of the protein produced by the inorganic, ferruginous material.

By microscopic studies of precipitated ferrous hydroxide and by means of micro-chemical tests it is shown that the protein bodies originate in microscopic masses of ferrous hydroxide.

Ferrous hydroxide provides a most appropriate

basis for at least two of the most fundamental processes functioning in a primitive organism.

1. It is a highly suitable source of energy.
2. It is a powerful medium for attracting the carbon dioxide of the air which supplies the carbon for the structural framework of the essential constituents of living substance.

The principal processes functioning in the living activities of the iron bacteria *Spirophyllum* and *Leptothrix* are essentially similar to those operating in the protein-producing experiments.

- (1) The general conditions in the highly characteristic experiments carried out by Lieske in the cultivation of *Spirophyllum* and those now carried out with the production of protein are similar. A solution of the same chemical composition was used in each instance.
- (2) The most essential condition for the growth of *Spirophyllum* and *Leptothrix* is reduced to the same basis as the primary reaction in the production of protein in the experiments: a combination of carbon dioxide with iron in the ferrous state.
- (3) The nitrogen relationships in Lieske's experiments with the growth of *Spirophyllum* and those with the production of protein are evidently very similar. When either of the two nitrogen-containing compounds in Lieske's solution was omitted in the experiments the amount of protein produced was greatly diminished.
- (4) The process providing the energy for the functions of *Spirophyllum* and *Leptothrix* is strictly similar to that in the protein-producing experiments. In each instance the energy is provided by the oxidation of a ferrous compound to ferric hydroxide.

From the remarkable similarities, both general and special, which are shown in each instance, it is concluded that the processes involved in the nutrition and respiration of *Spirophyllum* and *Leptothrix* are essentially similar to the processes functioning in the protein-producing experiments.

Granules of the nucleo-protein chromatin are located in the cells of the iron bacterium *Leptothrix ochracea*

growing in natural, iron-containing waters in the neighbourhood of Brisbane. By comparison it is found that the protein bodies contain a substance similar in all observed characteristics to the granules of chromatin in *Leptothrix*.

The remarkable similarity in the substance of the chromatin granules of *Leptothrix* and the protein bodies provides confirmative evidence of the extremely intimate relationship between the fundamental processes of the iron bacteria and those operating in the protein-producing experiments.

The demonstration of the chromatinic character of the protein bodies is extraordinarily significant. It immediately links up the results of the protein-producing experiments with many already recognised facts, such as the connection of iron with nucleo-proteins. Macallum's demonstration of the occurrence of iron in the chromatin of nuclei apparently universally throughout the plant and animal kingdom is singularly pertinent in this connection. Actually the writer's protein-producing experiments trace the connection between iron and chromatin back to its origin in the inorganic world.

The chromatinic character of the protein bodies acquires additional significance from the contention of Minchin that the earliest living beings were minute, possibly ultra-microscopic, particles which were of the nature of chromatin. Minchin's contention is based upon the special functions which chromatin is known to perform in the life processes of organism.

BIRD NOTES OF BRIBIE ISLAND AND THE PUMICE STONE PASSAGE.

By Mrs. W. M. Mayo.

The following notes cover visits at holiday times and some few year odd times "bird observing" among the islands and waterways.

The whole of Bribie Island and the Pumice Stone Passage, together with the mainland shore adjacent thereto, has been for about a decade a wild life sanctuary (?) As an actual fact, the sanctuary is shot over freely and constantly, and wild life there is growing very scarce and gun shy. Bribie Island is about twenty-four miles long, and has a wealth of trees—*eucalypts*, *casuarinas*, *melaleucas* and *eugenias*, together with *banksia*, and quantities of berry shrubs. Huge swamps and large tracts

of bracken help to make the island an ideal place for all forms of wild life. The waterway between island and mainland has a number of sandbanks and mangrove islands scattered about it, ensuring a happy hunting ground for the many native and migratory wading birds.

Wading and shore birds: Jabiru (*Xenorhynchus asiaticus*). For many years a pair of these big handsome black and white storks have homed on Bribie. They stand high on long coral pink legs and feed on the swamps and back-waters. I have not noticed young birds with them at any time; but last year I saw four adult birds moving in stately fashion through the timber. If they breed on the island it will be well away in the big swamp. The jabiru indulges in many a queer antic as it hunts for food.

Brolgas: (*Megalornis rubicundus*).—A brolga is nearly as large as a jabiru—a grey bird with red about the head. They are usually in companies of a dozen or so, and their weird call notes are apt to be alarming at nightfall when they fly overhead. It gives one a distinct thrill to see a company of these birds holding a dancing class on a big bare sandbank in the early dawn. Their movements are very graceful and they seem to get a lot of fun out of their airy dance.

Black Swans (*Chenopsis atrata*) congregate in immense numbers at times at the mouth of the creeks on the mainland shore: and in the back-waters between the lesser islands. Egrets (*Egretta alba*), Sacred Ibis (*Threskiornis molucca*), and the White-faced Heron (*Notopteryx novae-hollandae*) are also pretty plentiful there in the winter months.

The Little Egret (*Egretta garzetta*), the Royal Spoon-bill (*Platalea regia*) and White-headed Stilts are to be seen but rarely—beautiful birds, all three.

Pelicans (*Pelicanus conspicillatus*) have almost disappeared from the waters of the Passage. A few years back they were plentiful and added much to the beauty of the surroundings. We saw only one pair of pelicans during a three months holiday in that vicinity this year. Residents in the sanctuary say the birds are shot out by the men in the fishing boats. I do not know if that is true.

Cormorants (*Phalacrocorax varius* *P. ater* and *P. melanoleucus*) are always to be seen—their numbers never grow less. Now and again I have noticed a pair of the big black Cormorants (*Phalacrocorax carbo*) flying high overhead—they looked always in fine plumage. I have not noticed them on the sandbanks with the other cormorants.

The Darter (*Anhinga novae-hollandae*). Pairs of these birds are often to be seen perched on beacons or fishing in the water. Silver gulls and many species of tern. Caspian Tern, Gull-billed Tern, and the Crested and Little Tern haunt the Passage and gather on the big sandbanks opposite Caloundra. They follow the fishing boats, and squabble over the waste from the fishing nets. In January last Caspian Terns were feeding young birds—and very hard work they found it. Flying low over the breakers on the outer beach, the parent bird had first to catch the fish, then run the gauntlet of all the birds gathered on the sandbank, many of whom rose to intercept the flight and rob the bird of the fish before it reached the chick. In spite of the perils in transit of the food supply, the young birds looked well fed.

I noticed a lot of hustling and shoving amongst a group of crested terns one day and found they were all trying to edge out one of their own kind. When it was finally isolated I found the bird had a blood red breast. After much stalking to get near enough, my field glasses showed a small fish fastened to the bird's throat, hanging by what looked a fin. When the bird rose in flight the fish swayed in the wind. I thought I had discovered a freak in the bird world—a crested tern with a red breast—until the cause of the colouring became evident. Such accidents are rare, I think.

I have only observed one pair of Fish Aspreys (*Pandion haliaetus*) about the channels—the awkward way in which they strike the water when diving after fish always draws attention to them. The Fish Asprey is not unlike the white-breasted Sea Eagle (*Haliaetus leucogaster*) at a casual glance. There is a difference in size and chest markings and shape of tail. The birds are quite distinct when on the wing.

It is not unusual to see the Sea Eagle, the Whistling Eagle (*Haliaeetus sphenurus*) and the Red-backed (*H. indus*) in the air at the same time. The Black-cheeked Falcon (*Falco peregrinus*) hides in the thick trees by the waterside, to fly out, arrow-swift, at passing cormorants.

Of Spur-winged Plovers (*Loxia novae-hollandae*) and the Stone Plover (*Burhinus magisteris*), also the Pied Oyster-catcher (*Haematopus ostralegus*)—the first-named has grown very plentiful; and the two latter very scarce during the last few years. The time is not far distant when the eerie thrilling wail of the Stone Plover (or Curlew) will cease to echo among the passages at night-time—the loss will be ours.

Many migratory wading birds from overseas spend the summer about the twenty miles of waterway between Bribie Island and Caloundra. Curlews, Whimbrels, Godwits, Dotterels, Golden Plover, Turnstone, Sand-pipers, Greenshanks are the most usual; but there are others that I have failed to identify. Some few waders seem to stay all the year round, but by April the majority have left Queensland waters. Quite often the Golden Plover (*Pluvialis dominicus*) has mottled and changed into its striking breeding plumage before leaving our shores. The Red-capped Dotterel (*Charadrius ruficapillus*) breeds in Queensland.

Birds of the Mangrove Islands.

The Mangrove Dove (*Geopelia humeralis*) does not by any means confine itself to the mangrove islands. The bird is at home in any sort of country where "pigeon berries" are to be found, but some few are always to be heard and seen amongst the mangroves.

The Mangrove Honey-eater (*Meliphaga fasciocularis*) keeps pretty well to those precincts: and is usually plentiful on the lesser islands. A very bright songster and an active bird, it is often the dupe of the Pallid Cuckoo (*Cuculus pallidus*). The honey-eaters exhaust themselves gathering food for their monstrous foster birdlings.

The Mangrove Bittern (*Putorides striata*) is a weird kind of bird, and keeps mostly (but not wholly) to the mangroves. The bird fishes, perched on a low bough overhanging the water—or crouches—a stealthy, sinister shape by tidal pools. A bird is the last thing it looks like until the long neck darts out from the hunched shoulders, and a small fish is caught in the sharp beak. Then with a quick, mincing run the bird changes ground to the next pool. The Mangrove Bittern is much like a white faced heron when in flight.

The Mangrove Kingfisher (*Halyeon sordidus*) is very like *H. sanctus*, rather larger, a darker green, and with a white instead of a buff breast.

Last of the birds peculiar to the mangroves is the little Mangrove Warbler (*Gerugone cantator*). This dainty, soberly coloured three inch songster does not wander far from the water side, though occasionally the melodious song of the wee bird minstrel is heard from river gullies and back gardens close by. The bird puts in great work, ridding orange and mango trees of scale insect.

Birds of Bribie Island.

The island is a favourite winter resort for birds from the mountain regions and the southern States. There in the cold months are to be found Rose Robins, Regent Birds, Satin Bower Birds, Rufous Fantails, and many another visitor from the highlands. Flocks of Black Cockatoos fly over from the mainland, together with Parrots, when the Banksia cones are honey ripe. The notes of Fig Birds, Brush Wattle Birds, Orioles, Friar Birds, Cuckoo Shrikes, Blue-faced Honeyeaters, Miekies, Kookaburras and Whistlers all add to the gaiety in the bird world.

The song of the smaller Honey-eaters is never-ending from daylight until dark. The white-cheeked and the Lewin Honeyeaters are most to the fore; after them comes the Brown Honeyeater (the sweetest songster of them all), the Searlet Honeybird, the Spinebill, and the White-naped, the Yellow-faced, and the little Leather-head.

The Rufous Shrike Thrush, the Harmonious Thrush, the Red-backed and Lambert's Wren, Black-headed Pardalotes, Yellow Robins, Tree Creepers, Silver Eyes, Thornbills, the White-browed Scrub Wren, are all to be found either in the scrub or the open forest country. Butcher Birds are plentiful on the island, and must take heavy toll from the lesser bird life. The Pee-Wees and Wagtails like the open spaces round dwellings and in the vicinity of cattle. Their object in life is to rid the beasts of ticks, and they are thoroughly efficient in their work.

If the usefulness of birds to man, as well as their beauty, could only be impressed on the human mind, surely guns would be less often found in the hands of boys and men.

THE QUEENSLAND NATURALIST

JOURNAL OF THE QUEENSLAND NATURALISTS' CLUB
AND NATURE-LOVERS' LEAGUE

VOL IX

APRIL, 1934

No. 2

PROCEEDINGS.

ANNUAL MEETING, MONDAY, 27th February, 1934.—The Chair was occupied by the President, Mr. F. A. Perkins, and thirty-eight members and visitors were present. A short report on the excursion to Lone Pine was given by Mr. J. E. Young. Mr. N. Jack gave a list of the birds seen and heard. The Annual Report and financial statement were read and adopted. Election of officers for the year 1934 resulted as set forth in the inside cover of this issue. The retiring President, Mr. F. A. Perkins, gave an interesting address on "Entomology for Queensland Naturalists." Exhibits included:—(1) Wild Flowers from Tasmania, by Miss Williams; (2) Insects by Mrs. Williams; (3) Fungus specimens by Mr. N. Jack; (4) Photographs by Mr. J. Nebe; (5) Catfish eggs, by Dr. Mallaher; (6) Geological specimens, by Mr. K. Jackson.

EVENING MEETING, Monday, 19th March.—The President, Mr. E. W. Biek, occupied the Chair. A general report on the excursion to Nudgee was given by the Honorary Secretary, Miss E. E. Baird. Mr. N. Jack read a list of the birds seen and heard. The report was commented on by Mr. J. O'N. Brennan, Mr. G. H. Barker and Dr. D. A. Herbert. Mr. Brennan remarked that he was interested in the Snipe, as he had had a good deal of experience with this bird. He noticed that on its first arrival the bird weighted 4 ozs., but when ready to depart on its long flight to Japan it weighed 11. Dr. Herbert said that Snipe passed over the Philippine Islands but he had no definite information about their landing there, though he thought they did. Mr. J. E. Young read a paper on the birds of the Bunya Mountains. Mr. J. E. Nebe showed photographs of—(1) Mt. Edward gorge; (2) Natural grafts in sugar-cane *Angophora*; (3) Yellow wood regrown in paddocks; (4) Astronomical studies. Dr. E. O. Marks showed photographs of mud springs in Western Queensland in the neighbourhood of Eulo, and big sandhills on Thylungra station, between Quilpie and Adavale, Western Queensland. General exhibits included two volumes on the history of British birds by T. Bewick, published in 1805; of an aboriginal grinding stone by Mr. K. Jackson; of photographs of the National Park by Mr.

W. J. Sanderson; of fruits of the Guatemalan avocado by Mr. E. W. Bick; flowering specimens of the Wheel of Fire (*Stenocarpus*) and of *Pithecolobium Hendersonianum* by Mr. J. E. Young; of the Ball fruit (*Endiandra pubens*) and a fungus (*Polystictus xanthopus*) by Mr. C. T. White, of volcanic glass from Beech Mountain, and miscellaneous geological specimens and aboriginal artifacts from far Western Queensland by Dr. E. O. Marks.

ANNUAL REPORT FOR YEAR ENDING JANUARY, 1934.

Ladies and Gentlemen,

The Council of the Queensland Naturalists' Club submits the 28th Annual Report of the work of the Club.

Meetings.—Nine Council meetings, eight monthly meetings, a Wildflower Show and nine field excursions were held. Attendance at Council meetings was as follows:—Mr. Perkins, 8; Mr. Nebe, 6; Mr. Jackson, 8; Mr. Bick, 1; Miss Baird, 9; Mr. Kunze, 8; Mr. Young, 7; Mrs. Jackson, 7; Mr. Barker, 8; Dr. Herbert, 5; Dr. Marks, 4; Mr. Rowley, 5; Mr. Sanderson, 6; Mr. White, 6.

The attendance at monthly meetings has been good, the average being 33. Interesting lectures and papers on many branches of Natural History have been given by Dr. Herbert, and by Messrs. Bailey, Blake, Longman, Drain, Barnard and Barker. Exhibits have been shown and notes made on them by Mrs. Macdonald, Miss Williams, Dr. Herbert, and Messrs. Young, Simmonds, Jackson, White, Perkins and other members. Reports of excursions, specimens and photographs taken on them have been given by Messrs. Young, Jack, Nebe, Barker, White and others.

The Wildflower Show was held in the Albert Hall on Saturday, September 9th. The exhibits were quite as beautiful and varied as usual, but the financial return was hardly so satisfactory.

Membership.—It is with great regret that the deaths of Mrs. S. E. Curtis of "Hopedale," Mr. B. Dunstan, Mr. D. W. Gankrodger and Dr. T. L. Bancroft are recorded.

Membership now stands at 125; of whom 88 are town members, 6 are honorary and 31 are country members. Eight new members have been elected, and 15 resignations received.

The Naturalist.—Three issues of the journal have been published during the year.

General.—The attention of the Department of Agriculture and stock was directed to reports of the killing of

protected birds by Italian residents in the sugar areas. The help of the Department of Public Instruction was also enlisted and a notice was printed in the Education Office Gazette.

The Club interested itself in the matter of the Central Queensland Bird Protection Association's case against an offender robbing a pee-wee's nest in the local park. The Association prosecuted the offender—a minor—and secured a conviction, the Magistrate going one better by fining the father as well. An appeal was lodged and though the conviction was upheld, the father's fine was remitted and costs of action given against the Association. This body then appealed to the Minister for Agriculture and Stock for financial assistance to cover the costs, which, through no fault of theirs had been given against them, but without success. This Club then arranged a deputation to the Minister to urge that the matter be reconsidered. It was then learned, that owing to the fact that the Central Queensland Association had been warned not to take legal action in such cases without first referring the matter to the Department, the Minister simply could not, in face of such instructions, pay for legal expenses which would have been performed by the Crown Law Department without cost to the Association. In face of this information the deputation could only thank the Minister for receiving them and withdraw. As a measure of consolation the Club Council later donated the sum of £2/2/- to the funds of the Central body.

LIBRARY.

The Hon. Librarian (Mrs. Eva M. Jackson) reports:—

The Library continues to be a most popular branch of the Club's activities, and is largely availed of by Club members.

During the past year, at the General Meetings held during that time, about 80 books and about twice that number of magazines were lent to town members. Country members, too, have been catered for, and parcels of magazines and pamphlets were forwarded from time to time by the Secretary. Books specially asked for have also been posted to those making the request.

During the year several very useful text-books on various nature subjects—prominent among these being "What Butterfly is That?" by Dr. Waterhouse—have been received for review by the Hon. Editor of the "Queensland Naturalist," and have been passed on by him to this Library. They should prove of special interest to new members.

A very large number of scientific pamphlets and works are annually received both from British and foreign countries, and are available to members who may be interested.

The most popular magazine in the Library still continues to be the National Geographic, closely followed by the American Natural History. All numbers of the National Geographic have been kindly donated by Mr. J. Nebe.

Donations of many numbers of "Bird Lore" and other magazines have also been most generously donated by Mr. G. H. Barker and several other members, and any further donations of suitable books which any member may be inclined to make will be gratefully received.

EXCURSIONS.

Excursion Secretary (Mr. J. Edgar Young) reports:—

The principal event for this year was staged during Easter holidays at Caloundra. Our party of twenty-eight left town on the Thursday afternoon by the "Koopa," and camped for the night at Bribie in tents, except for a few men who spent an uneasy night on a heaving launch or the hard pier-head.

After an early breakfast the whole party embarked on the launch for the remainder of the journey through the shallows and intricacies of the pumice-stone passage, which was of much interest owing to the variety and numbers of bird life on the water and banks, the black swans, some thousand of which were seen, were of especial interest owing to the fact that this is probably the only place left in Australia, or at all events in the eastern portion, where they still occur in considerable numbers.

The party arrived in camp about 3 p.m. The remainder of the tents were pitched and all made snug for the night.

During the two following days the party closely investigated the headland and the beach for several miles northward, and also the swamp and bush areas adjoining, finding much of interest in all branches of nature study.

Heavy showers which occurred both by day and night caused some little flooding of tent floors, but no real damage.

The return journey was safely negotiated. After an early start on Monday per launch and steamer.

Other single or half day excursions were held as follows:—

Kuraby.—Botanical and ornithological.

Samford Range.—By motor train to the summit and walking to Ferny Grove by road. General.

Kingston Gold Mine.—An examination of the workings. Chiefly Geological.

Grovely.—By motor train to golf links, and walking over the range to Walton Bridge, returning by tram from Ashgrove. Interests general.

Castra.—By motor bus to creek and water holes. General.

Klump Rd.—By bus and walking thence to Sunnybank. General.

Greenbank.—By bus to water holes and forest. General.

Colmslie.—Old quarantine area, by river launch and walking to Bulimba. General.

The Council has endeavoured as far as possible to keep the expenses of these excursions within the limits of all its members.

The interest in outings is fairly well maintained, and the attendance usually good.

QUEENSLAND NATURALISTS' CLUB.

Annual Receipts and Expenditure (Year ended Dec. 31, 1933).

RECEIPTS.		£	s.	d.
To Cash at Banks, December, 1932	85	13	4
„ Members' Subscriptions	44	10	0
„ Tent Hire	3	0	0
„ Sale of "Naturalist"	1	1	0
„ Lantern Hire	1	11	6
„ Surplus from Exeursions	1	10	0
„ Commonwealth Bank Interest	1	17	7
„ Flower Show Receipts	27	16	6
		£166	19	11

EXPENDITURE.		£	s.	d.
Printing "Naturalist"	20	5	8
Rent, Women's Club Lounge	8	0	0
Rent, Women's Club Committee Room	2	0	0
Petty Cash. Secretary	15	0	0
Insurance	0	5	7
Purchase of Tent	8	0	0
Subscription to Council for Scientific and Industrial Research	1	1	0
Affiliation Fee, Hortie. Society	0	10	6
Tent Pegs	0	7	0
Wild Flower Show Expenses	25	3	10
Subscription to Lord Memorial	1	1	0
Short Exeursion Expenses	0	8	0
Sub., Cent. Qld. Bird Protection Assn.	2	2	0
Bank Charges (Perm. Bld., etc.)	0	5	0
Balance at Banks	82	10	4

F. O. KUNZE, Hon. Treasurer.

£166 19 11

NATURE LOVERS' LEAGUE, 1933.

RECEIPTS.		£	s.	d.
To Fwd. from 1932		£13	11	11
		<hr/>		
		£13	11	11
EXPENSES.				
4/1/33, Insurance		0	3	0
Balance Fwd. (in Banks)		13	8	11
		<hr/>		
		£13	11	11

F. O. KUNZE, Hon. Treas.

ENTOMOLOGY FOR QUEENSLAND NATURALISTS.

(By F. A. PERKINS, B.Sc.Agr., University of Qld.)

(Presidential Address delivered on 26th February, 1934.)

In most Natural History Clubs a large proportion of the members are entomologists, or at least, are interested in the biology of insects. Unfortunately, this is not true in the case of the Queensland Naturalists' Club, whose members, with one or two exceptions, devote their attention to other branches of Natural History. The reasons for this appear to be:—(a) The presence in Queensland of a strong Entomological Society. Actually the Entomological Society is not a strong competitor, for the majority of its members are professional entomologists, who differ from the naturalist in many ways, in their attitude towards entomology. (b) lack of knowledge of how to collect, rear, preserve and mount insects. With experience and a very little study this difficulty would soon disappear. (c) Apparent scarcity of insects during the winter months. This is due entirely to ignorance of the habits of insects. (d) Lack of inspiration. It is the aim of this address to put forward a series of suggestions, any one of which is well within the scope of the average member of the Club. They are as follows:—

Collecting.—Generally an entomologist starts as a collector of insects, and there is no doubt that considerable pleasure and interest can be obtained from making even a small collection. Unless, however, a collection is restricted in some way, it soon becomes a task which is too much for any one person. Nearly 40,000 species have been described from Australia, and to collect, mount, and house even a portion of this large number, requires more time and money than are at the disposal of the average naturalist. Collecting can be restricted in many ways, and the following are a few suggestions which might be

adopted by members:—

(a) *A Collection of insects from a definite area.*—This method was adopted by Dr. C. A. Waterhouse, who made a very interesting collection of insects, all of which were actually caught in his garden at North Sydney. The making of this collection gave him and his family considerable pleasure for a number of years, several thousand species being collected.

(b) *Collection of aquatic insects.*—There is plenty of scope for a collection of this type round Brisbane, and such a collection would include a wide range of insects.

(c) *A collection of the species of a taxonomic unit*, such as an order, family, or genus. It is in this way that most systematic workers in Entomology commence.

In spite of the above, collecting alone is not recommended for Club members, although a certain amount of collecting is necessary in most entomological work. Members are strongly advised to go in for real Natural History, and to take as their ideal that great French Naturalist, Fabre. In fact, it would be a good idea if all prospective members were asked to read at least one of Fabre's books before election. Such work usually involves the identification of the insect being studied, the working out of the full details of its life cycle from egg to adult, the seasonal history, i.e., the number and duration of generations in a year; the relations of the insect to its host or hosts; its relation to other insects; and finally a complete study of its habits and behaviour. Simple homely experiments are all that are required, and the interest and pleasure derived from the work are out of proportion to the labour involved. As in the case of collecting it is essential that a study of the natural history of insects be restricted in some way. The following are suggestions which may prove of interest to members.

(a) *Study of the insects associated with some natural botanical group.*—Wattle, Banksia, Cassia, Mangrove, and Tea-tree, are only a few that might be mentioned, any one of which acts as a host for a large variety of insects, the majority of which have not been studied by naturalists. It would be advisable for a beginner to confine his attention to one particular host species, and preferably to one or two plants. Eucalypts support many insects, but except in their young stages are rather inaccessible. For naturalists who prefer to devote their attention to problems with an economic bias, a study of the insect pests of weeds, grasses, or garden flowers would provide an interesting and useful piece of work. Research on the insect pests of our native grasses has been neglected in the past,

and the necessity for such work has been emphasised during the last two or three years.

(b) *Study of the insects on the surface soil of either (1) rain forest, (2) open forest, or (3) sea-shore.* It has been estimated that 90 per cent. of insects spend some portion of their life cycle in the soil, and any naturalist who undertakes a study of this kind will soon be convinced that the estimate is reasonably correct. Such work has received very little attention in Australia, and a wealth of most interesting material awaits naturalists. The order Protura was first discovered in Australia in 1930, and has not yet been recorded from Queensland, although it is almost certain to occur here.

(c) *Study of aquatic insects.*—The natural history of insects belonging to the orders Plecoptera, Odonata, Perlaria, Coleoptera, Hemiptera, Neuroptera, Trichoptera, and Diptera has not been studied in Queensland to any great extent. The study of aquatic insects can be done in the home, provided suitable aquaria are available. The aquaria need not be large; in fact, small aquaria are the more suitable, because most aquatic insects are cannibals and have to be isolated.

(d) *Gall Insects.*—In Australia there is a great number and variety of gall-forming insects, and the study of these insects and their galls is specially recommended to Queensland naturalists. Representatives of the Coccidae, Hymenoptera, Diptera, Thysanoptera, Coleoptera and Lepidoptera stimulate their hosts to form galls varying considerably in size and pattern. The structure of the gall, the method of its formation, the relation of the insect to its host, and the parasitism of the gall insect are phases of this subject which would provide a most interesting study. Galls are abundant throughout the year, and can be found on any excursion.

(e) *Biology of a particular group: e.g.—*

(i) *Apterygota.*—Wingless insects belonging to the orders Thysanura (silver-fish), Protura, and Collembola (Springtails). All these insects are found in the soil, or under bark or stones, and practically nothing is known of their life history, seasonal history, and habits.

(ii) *Native Bees.*—These are very common in Australia, and what little is known of their habits and life history shows conclusively, that they would be an ideal group for study by field naturalists. Some are parasitic, while others such as the carpenter bees, leaf-eating bees, and honey-bees, build nests differing very much in structure.

(iii) *Ants.*—Australia is the home of some of the most

interesting ants known to the entomologist. The primitive Ponerine ants (Bulldog ants), honey-pot ants, green tree ants, mound ants, and many others are well worthy of study. The structure of the nest, the relation of the different castes in the nest to one another, the enemies, and the inquilines are phases of this study, to which men in other parts of the world have devoted their lives.

This list of suggestions could be multiplied many times, but the above are considered to be the most suitable for members of the Naturalists' Club. Any one of them will provide a most interesting study in Natural History, and it is to be hoped that some of the members of the Club will endeavour to adopt them.

THOMAS LANE BANCROFT, NATURALIST.

By HENRY TRYON.

Since the date of issue of the last volume of Queensland Naturalist there departed from amongst us one who had veritably won that title in a life-long career, in the person of "Tom Bancroft"—Dr. T. L. Bancroft, M.B. (Edin.), the only son of the late Dr. Joseph Bancroft, M.D., and one, too, of like fame. A short illness at Wallaville preceded his death, at the age of 73 years, on 12th November, 1933, his interment being in the Toowong (Brisbane) cemetery on 14th November. He was educated at the Brisbane Grammar School, thence he proceeded to the Edinburgh University, where he took his medical degree.

On returning to Brisbane in the early 'eighties, his spare time was soon devoted to natural history pursuit, especially at Burpengary, Deception Bay, and for the behoof of the Queensland Museum, to which already in 1884 he donated several fish, including the remarkable local Ray, *Actobatis narinari*. For the Queensland Museum he collected specimens of birds and insects, and the Queensland Herbarium benefitted by an extensive series of botanical specimens, including groups such as the charophytes, marine and fresh water algae, etc.

In 1885 he entered upon the post of Resident Doctor at the Innisfail (then Geraldton) Hospital, North Queensland. Here again he paid considerable attention to both animal and plant life. Thus to the above institutions he contributed further specimens of birds and plants respectively. This post he held till the following year (1886), when he left Geraldton and visited the Flinders River and Gregory River countries and Normanton, whence also the Museum and the Herbarium received specimens collected in these districts by him. It may be mentioned that

these early interests in the Queensland Museum and the Queensland Herbarium respectively were sustained for the rest of his life, and need not be here further detailed. His contributions illustrating the Lung Fish, *Ceratodus forsteri*, its habits and life history, received by the Museum from Eidsvold, Upper Burnett River, must not, however, be overlooked in this connection.

Shortly after his arrival in Brisbane from Edinburgh he assisted his father in developing the medicinal use of *Alstonia scholaris*, and gave early attention to the Queensland flora in its relations to pharmacology. In 1885, whilst Medical Superintendent of the Johnstone River Hospital, he revealed the toxic principles residing in *Daphnandra repandula*, *D. micrantha*, and *D. aromatica* (Monimiaceae); *Archidendron Vaillantii* and *Pongamia glabra* (Leguminosae); and *Zanthoxylum veneficum*, *Z. torvum*, and *Z. brachyacanthum* (Rutaceae). In all cases, as was usual with him, he established his conclusions by physiological experiments and an exact interpretation of their results (See: "Preliminary Notes on Some New Poisonous Plants Discovered on the Johnstone River, North Queensland," Proc. R. Soc. N.S.W., 1887).

There were published again in 1887 (Proc. R. Soc. Qld., Vol. IV.) four papers: (1) "On the Poisonous Property of *Nicotiana suaveolens*"; (2) "On the Discovery of Saponin in *Acacia delibrata*"; (3) "On the Physiological Action of *Cryptocarya australis*"; (4) "On the Physiological Action of *Daphnandra repandula*."

In 1888 his investigations had sufficiently advanced to admit of his reading, before the Section of Pharmacology of the Interecolonial Medical Congress of Australasia, held in Melbourne in January, 1889, a paper entitled: "On the Materia Medica and Pharmacology of Queensland Plants" (Trans. I.M.C. of Australasia, Second Session, Melb., 1889, pp. 927-931). This not only records conclusions already reached, but topics worthy of investigation, and some novel discoveries, of which may be mentioned one relating to the Queensland species of *Strychnos* (*S. psilosperma* and *S. lucida*).

In 1887 he visited New Zealand, and following this a paper, "Preliminary Notes on the Pharmacology of Some New Poisonous Plants," was read at the November, 1889, meeting of the Linnean Society of New South Wales (Proceed. Vol. IV., Series 2, pp. 1061-4). This dealt with: (a) New Zealand plants that he had collected there in June, 1887, in which he refers to the poisonous principle of *Laurelia nova-zealandiae*, *Myoporum laetum*, and *Melicy-*

tus ramiflorus, and to negative results yielded by four others; and (b) with five Queensland species.

Animal Pathology.—The late Dr. Bancroft addressed himself to several matters regarding animal diseases. As instance of this may be mentioned his investigation of the nature of the "Birdsville (Qld.) Horse Disease" in 1892; this indicated that it was "an epizootic pneumonia, probably of bacterial origin." In a short paper, "Notes on Some Diseases in Stock in Queensland" (Rep. Chief Insp. Stock, Qld., 1892, p. 4 and Appendix), the following additional stock disease are also identified as occurring in Queensland:—

Horses:—Maw Worm, *Spiroptera megastoma*; Lung Worm, *Strongylus micrurus*; Worm aneurum, *Strongylus armatus*, of the mesenteric arteries; Intestinal Worms, *Ascaris megalocephala*; the Worm-parasite, *Oxyuris curculla*; a Tape Worm, probably *Taenia plicata*; "Swamp Cancer," a sarcoma and not a carcinoma; true cancerous growth from the eye and conjunctiva of a horse.

Cattle.—Tuberculosis, pleuro-pneumonia, and actinomycosis of the lower jaw, all in a Diamantina oxen; the small harmless stomach fluke, *Amphistoma conicum*; the nodule-forming worm *Oesophagostoma columbianum* of intestines, mesentery and Orientum (also in sheep); Onchocerca Worm Nodules; Ricketts, Zamia poisoning; symptomatic Anthrax of calves; so-called "Cancer" of aged cows, a sarcoma; Scrotal Tumour, *Lymphangioma*; genuine local carcinomatous growth in dogs.

To revert to the subject of maladies of the horse, it may be noted that in 1891 the late Dr. Bancroft read a paper before the Royal Society of Queensland (Proc. R. Soc. Qld., Vol. VIII., p. 65-7, 1892), "On Psorais in Horses, known in Queensland as Mange," and that had been, during 1888 and 1889, the object of investigation on the part of others who had affirmed that it was a disease of parasitic origin, caused by the fungus *Trichopyton*, whereas it was one "of a climatic and constitutional nature," pigment having been mistaken for this fungus.

Considerable attention was also bestowed on the diseases of rodents in view of the significant role played by certain rat species as transmitters of human maladies. Thus in 1893 we have his paper, "On the Whip Worm of the Rat's Liver, *Trichocephalus* sp.", read before the Royal Society of New South Wales (Proc. R. Soc. N.S.W., 1893, p. 86-90, Vol. VII.).

Medical Entomology.—Dr. T. L. Bancroft being so closely associated with his father, Dr. Joseph Bancroft,

especially during the period when the latter was free to devote time to scientific enquiry, naturally was imbued with the importance of *Filaria* spp. and their relation to disease. The elder naturalist, as is well-known, working independently, had not only confirmed in 1876 by investigation, Dr. T. R. Lewis's earlier discovery of microfilaria inhabiting human blood; but also in the same year, 1876, had found occurring in a lymphatic abscess in man the sexually mature form *Filaria Bancrofti*, and that Lewis himself also met with in a blood clot in the following year. Further, a third worker, Dr. P. Manson, had discovered the larval haematozoon in the stomach of mosquitoes and exhibiting new higher life phases than those characterising the microfilaria or larvae in the blood, and that pointed to the genetic relation between larvae and adult, as occurring in man. Its further transformations, and the migration of the nematode *Filaria* with the mosquito need not now be detailed. But these discoveries created far-reaching world interest, since *Filaria* infestation of man implied the incidence of widely occurring serious ailments of one kind or another in man, and new factors relating to their causation awaited research. It still remained to be found out, however, how the now shortened and thickened filaria-worm was transferred from the insect to man. Many conjectural explanations were advanced, the one most favoured being the emigration of the still immature filaria from the mosquito-host to drinking water and thence to its final host—man. Experiments conducted by many workers, however, failed to show that any one of the suggested methods held good.

It was Dr. T. L. Baneroff who, in bringing his own observation on the mosquito-economy to bear on the question, discovered how this passage from mosquito to man was brought about. He demonstrated that a certain number of days must elapse after the mosquito had acquired the larval filaria (microfilaria) from man's blood before effective transference could ensue, since it was necessary that it must first have attained to a certain stage of development, covering a period of 16-17 days, and that a time limit was thus involved. He further was able to show that in experiments conducted by others the filaria-infested mosquitoes had died prior to this event, and to this time limit being reached, and also that this fatality had happened since the necessity of feeding the mosquitoes had been lost sight of. The foods they required, he had discovered, was not blood, but simply ripe bananas, or, better still, dry dates as sold by the grocer. He found also that any larval filaria from mosquitoes would soon die on entering water, but that, on the other hand on attaining the proper stage of growth

(in about three weeks) they would pass from mosquito to man through the medium of the insect's proboscis on its puncturing his cuticle. These facts Dr. T. L. Bancroft set forth in a communication to the Australian Medical Gazette of June 20, 1898, entitled "*Metamorphosis of *Filaria sanguinis hominis*,"*" and in two subsequently published memoirs, entitled respectively: (1) "*On the Metamorphosis of the Young Form of *Filaria Bancrofti* Cobl. (*Filaria sanguinis hominis* Lewis, *Filaria nocturna* Manson) in the Body of *Culex ciliaris* Linn.—the 'House Mosquito' of Australia"* (Jnl. and Proc. R. Soc. N.S.W., Vol. XXXIII., pp. 48-62, Figs, 1-6. Read 7th June, 1889); and (2) "*Preliminary Notes on the Intermediary Host of *Filaria immitis* Leidg.*" (Same journal Vol. XXXVI., pp. 41-46).

Filaria and Birds.

In 1889, Dr. T. L. Bancroft contributed a paper to the Royal Society of Queensland (Proc. R. Soc. Qld., Vol. VI., pp. 58-62) dealing with the occurrence of *Filaria* in the blood of the birds of the Eidsvold district.

In 1908 he published a remarkable work in his "List of the Mosquitoes of Queensland with the Original Descriptions and Notes on the Life History of a Number," constituting Annals of the Queensland Museum No. 8.

Dengue Disease and the Mosquito.

On the occurrence of the 1905 epidemic of Dengue in Southern Queensland and north-eastern New South Wales, Dr. T. L. Bancroft was retained by the Commissioner of Public Health, Dr. Burnett Ham, M.D., to enquire into certain aspects of the outbreak. Accordingly he submitted an account that is embodied in the Commissioner's "Report on an Epidemic of Dengue Fever in Brisbane," Brisbane, July, 1905 (Parliamentary Paper), pp. 4 and 5.

Symbiotic Bacteria in Plants.

In April, 1893 a paper entitled "Note on Bacterial Diseases of the Roots of the Leguminosae" was read at a meeting of the Linnean Society of New South Wales (Proc. Vol. VIII., Series 2, pp. 51-2, Pl. IV.).

Industrial Projects (Plants).

Whilst residing at Burpengary, Deception Bay, an effort was made by him to raise new forms of economic plants. This undertaking had special reference to Cotton and Castor Oil.

Plants' Latex and Protozoa (Phytomonas).

In May, 1927, a paper by Dr. T. L. Bancroft, entitled

"Flagellates in Certain Queensland Plants—Preliminary Notes" (Proc. R. Soc. Qld., Vol. XXXIX., p. 22, 1928), was apparently the first notice of their occurrence in the Australian flora. Bancroft's discovery was of their presence here in the milk of *Sarcostemma* and *Hoya*, two Asclepiads, and in that of *Ficus scabra*. He mentioned also that certain insects performed the role of intermediate host for these latex-occurring flagellates, and in the case of the *Hoya* a plant bug, *Oncopeltus quadriguttatus*.

Ceratodus and Barramundi.

Dr. Bancroft during his residence at Eidsvold bestowed particular attention on the *Ceratodus Forsteri* and its habits as displayed in the Burnett River.

In May, 1916, he contributed to the Royal Society of Queensland some notes on a second ancient fish, the Dawson River Barramundi (*Scleropages Leichhardtii*), (vide Proc. R. Soc. Qld. Vol. XXVIII., p. 93, 1917). On 28th May, 1923, he made a further contribution to the Society on this Fish, entitled "Some Further Observations on the Dawson River Barramundi—*Scleropages Leichhardtii*" (Proc. R. Soc. Qld. Vol. XXXV., pp. 46-47, 1924). In this he stated inter alia that the fish carried its spawn in its mouth, and that when meshed in the net ejected it, also that previously (1922) he had discovered that the "Salmon Cat-Fish" of the Burnett River likewise carried ova in its mouth.

Palm Island.

Until a year or two before his death he had for a few years filled the post of Medical Superintendent at the Aboriginal Settlement, Palm Island, North East Queensland, and a large series of botanical specimens were collected and forwarded to the Queensland Herbarium.

General.

A special feature in Dr. T. L. Bancroft's attitude of mind towards science was the free, unreserved, and full manner in which he co-operated with other naturalists. In this way he co-operated with C. W. de Vis and later Directors of the Queensland Museum, F. M. Bailey in his work on Queensland plants, J. H. Maiden in his work on Eucalypts, J. B. Cleland on the food of native birds, H. Tryon on fruit flies and other insects, E. W. Ferguson on Tabanid flies, and others, both in Australia and abroad. His name is commemorated in botany and zoology by the following:—

Botany:—

Acacia Bancroftii J. H. Maiden;

Backhousia Bancroftii Meuller & Bailey;

Cryptocarya Bancroftii F. M. Bailey;



DR. THOS. L. BANCROFT.



Common Bloodwood (*Eucalyptus corymbosa*). Gundiah, S.E.
Queensland.
Photo by C. T. White.

Beilschmiedia Bancroftii C. T. White;
Elaeocarpus Bancroftii Meuller & Bailey;
Eucalyptus Bancroftii J. H. Maiden.

Zoology:—

Culex bancrofti Skuse;
Myzorhynchus bancrofti Giles;
Filaria bancrofti Cobbold;
Microfilaria bancrofti Fullerton;
Pseudambasis bancrofti de Vis.
Haemaphysalis bancroftii Nuttall and Warburton.

Part
 XI

THE EUCALYPTS OR GUM TREES OF THE BRISBANE DISTRICT.

(By C. T. WHITE, Government Botanist.)

(Continued from the "Queensland Naturalist,"
 Vol. IX., p. 9.)

21. *Eucalyptus corymbosa*, Common Bloodwood.

Description.—A large tree with a persistent bark, the bark often somewhat spongy and friable, broken into very irregular tessellations, outer layer flaky, the inner layers rather fibrous. Leaves on coppice shoots or young trees not markedly different from those on the adult trees but sometimes very large, up to 9 inches long and $2\frac{1}{2}$ inches broad, on a petiole or leaf-stalk of 1 inch or more, subcoriaceous in texture, more or less lanceolate in shape, straight or sometimes slightly falcate; apex drawn out into a slender point, base acute equal side or more frequently slightly oblique. Ordinary (secondary or adult leaves) straight or somewhat falcate lanceolate, apex acute: rather glossy green above, paler and opaque beneath; petiole or leaf-stalk $\frac{1}{2}$ to 1 inch long; blade varying somewhat in size but mostly about 4 inches long and 1 inch broad; lateral nerves fine, parallel and close together (mostly about 1 line apart), intramarginal vein very close to the edge and sometimes scarcely distinguishable from the thickened and slightly recurved leaf margin. Flowers in umbels, the umbels in panicles, the panicles terminal and in the upper leaf axils, the whole forming a somewhat corymbose inflorescence. Individual flowers varying greatly in size; calyx tube short tapering into a long pedicel, pedicel and calyx together measuring from $\frac{1}{3}$ to $\frac{3}{4}$ inch long, operculum short hemispherical. Stamens in several series all fertile, in the larger flowered forms the longer filaments up to nearly $\frac{1}{2}$ inch; anthers opening by longitudinal parallel slits. Seed capsules urn-shaped or subglobose, about $\frac{1}{2}$ inch in diameter, 3-4 celled, valves very deeply sunk.

Distribution.—Eastern Australia from the north-eastern corner of Victoria to the Atherton Tableland, North Queensland.

Common Name.—Mostly simply called Bloodwood or Common Bloodwood, sometimes Red Bloodwood to distinguish it from *E. trachyphloia*, but though the timber is usually deep red especially in the larger and older trees, it varies to pink and almost white.

Botanical Name.—*Eucalyptus* (see under No. 1), *corymbosa* Latin referring to the corymbose arrangement of the flowers (from Latin *corymbus*—Gr. *korymbos*—a cluster of fruit or flowers).

Timber.—A very durable hardwood, not sawn on account of its numerous gum veins, but extensively employed for fencing, house blocks, sleepers, etc. For the last purpose its life is considerably lessened by its tendency to scale off along the "gum veins" or cracks filled with a dark red kino or "gum."

Botanical References.—*Eucalyptus corymbosa* J. E. Smith in "A Specimen of the Botany of New Holland," p. 43, 1793.

THE QUEENSLAND NATURALIST

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PROCEEDINGS.

EVENING MEETING, 16th APRIL, 1934.—The Chair was occupied by the President (Mr. E. W. Bick), and about 45 members were present. The evening was devoted principally to reports of the Easter Camp at Mount Edwards Gorge. Reports were given by Mr. J. E. Young (General), Dr. E. O. Marks (Biology), Mr. C. T. White (General Botany), Mr. S. L. Everist (Grasses), Mr. F. A. Perkins (Insects), and Mr. G. H. Barker (Birds).

A series of photographs taken on the outing were exhibited by Mrs. G. Jackson and Mr. W. J. Sanderson. It was proposed that a letter of thanks be sent to Mr. Hayes, on whose property the camp was held. General exhibits included a stone axe picked up on the road to Mount Edwards by Mr. Ken Jackson, a specimen of *Azolla rubra* by Mr. J. E. Young, and a luminous fungus (*Hiatula Wynniae*) by Dr. D. A. Herbert. It was announced that a box for the setting up of insects had been purchased, and was available on loan to anybody interested.

EVENING MEETING, 21st MAY, 1934.—The President, Mr. E. W. Bick, occupied the Chair, and about 35 members were present. Mrs. G. Lydement and Miss C. N. Clark were elected ordinary members of the Club, and Mrs. C. House country member. Reports on the excursion to St. Helena were given by Mr. E. W. Bick (Botany) and Dr. E. O. Marks (Geology). A report on the birds observed on the excursion to Ferny Grove was given by Mr. Jack. Mr. A. Cayzer, B.Sc., Lecturer in Biology, Queensland University, gave a very interesting lecture on regeneration, illustrating his remarks by means of numerous lantern slides. Exhibits included some biological specimens from the Carnarvon Ranges by Mr. J. Nebe, and a large ant by Mr. G. Rowley. The exhibits were commented on by Dr. E. O. Marks and Mr. H. Tryon respectively.

EVENING MEETING, 18th June, 1934.—The President, Mr. E. W. Bick, occupied the Chair, and about 40 members were present. Mr. S. T. Blake, M.Sc., and Mr. S. L. Everist were elected ordinary members of the Club. A report on the birds of the Mount Mee excursion was given by Mr. G. H. Barker. A series of land shells col-

lected on the excursion by Miss Carrick were commented on by Mr. H. Tryon. A general account of the geology of the district was given by Dr. E. O. Marks. Mr. J. Nebe showed an excellent series of lantern slides made from photographs taken on the Mount Mee excursion. A grasshopper collected on the excursion by Dr. Malaher was commented on by Mr. H. Tryon.

The President introduced Mr. J. B. Howie, President of the Mitcham Naturalist Club, Victoria, who was on a visit to Queensland. Mr. Howie spoke on the wonderful flora of the Grampians, and showed two albums of photographs to illustrate his remarks. A lecturette on the collecting and mounting of insect specimens was given by Mr. F. A. Perkins. A report on the birds observed on the excursion to Mount Coot-tha was given by Mr. N. Jack. Dr. Croll forwarded specimens of *Calendula* flowers showing extreme proliferation. Some specimens from Cracow were tabled by Mr. Williams and commented on by Dr. E. O. Marks. A book, "Birds of Tasmania," by Mr. F. N. Littler, was tabled by Dr. A. Malaher, who presented it to the library.

EXCURSION TO MT. EDWARDS, EASTER, 1934. GEOLOGICAL NOTES.

By E. O. Marks, M.D., B.A., B.E.

From the geologist's point of view the residents of most of the other Australian capitals must be envious of the great variety of geological structures and problems within reach of Brisbane. Of the many interesting localities, the Fassifern district is one of the most attractive, whether it be for the study of the divers and diverse igneous rocks and of the vulcanicity which they represent, or for the investigation of questions relating to the development of the beautiful varied scenery, as well as the striking escarpment of the Main Range.

The camp site at the entrance to the Mt. Edwards Gorge was well situated for the geologist, but it was a matter of very keen regret to the present writer that his ambulatory powers did not permit of taking full advantage of the opportunity which the trip offered. These notes, in consequence, are a general impression and do not represent new observations.

While there are marine strata of Carboniferous age at Mt. Barney, the oldest rocks in the vicinity of Mt. Edwards are the sandstones and shales which Mr. J. H. Reid, of the Geological Survey, has shown to belong to the Walloon (Jurassic) series constituting the coal measures of Rose-

wood, Beaudesert and Darling Downs. Into these Walloon strata there have been intruded a great variety of igneous rocks, both of the light-coloured trachytic and the dark heavy basaltic types, in the form of plugs, dykes and sills. Upon the sediments there have been extruded volcanic ashes or tuffs, as well as enormous thicknesses of basaltic lava. In the Main Range there is a thickness of up to 3,000 feet of volcanic material on top of the sandstone!

In spite of this evidence of intense and prolonged vulcanicity, the Walloon strata usually show only gentle dips though sometimes steeper dips do occur. The most notable disturbance of the strata is probably that seen on the western side of Mt. Alford, above Moogerah school, to which attention was called by Mr. S. B. Watkins. Here an outcrop of sandstone, in character more like the Bundamba rather than the usual Walloon sandstone, has the bedding tilted to vertical, with the strike in a north-east-south-west direction. From its appearance this must represent an important fault line, curiously enough in a direction at right angles to the Main Range. Like other big geological faults in south-eastern Queensland, this fault does not appear to have any direct effect on the present surface levels.

Owing to their greater hardness and resistance to weathering the igneous rocks, and especially the trachytic rocks, give rise to the many isolated mountains of the district which give it its picturesque charm. Mt. Edwards is composed of trachyte, and through it Reynolds Creek has cut the remarkable gorge which forms such a surprising contrast to the wide valley both above and below. This gorge gives us the clue to the development of the present drainage system and topography of the region. Reynolds Creek rises in the Main Range about twelve miles away, and continues on in the same direction after passing through the mountain. On the map the creek appears to take no notice whatsoever of the 2,000 feet trachyte mass situate right on its course, although a comparatively small deviation would have avoided it.

Now we know that trachyte is very resistant to denudation, and remains as bold hills when the surrounding softer rocks are denuded away. The Mt. Edwards mass probably represents the core of a volcano. Whether as a volcano, or after subjection to denudation, it must have formed a prominence, not the bottom of a valley. When Reynolds Creek started its career it would have followed some depression, shallow or deep, and there could have been no mountain to obstruct its course, and prevent it from pursuing the even tenor of its way. It must, there-

fore, have started its career above the present Mt. Edwards, which must have been entirely covered by some later formation. Subsequent denudation exposed the resistant trachyte, down through which the creek has succeeded in cutting its gorge, much as a saw cuts in its groove.

The only later rocks which we know of that could have covered the trachyte mass are the basaltic flows, and these in portions of the Main Range do cover trachytic material. It seems highly probable that these basalt flows of the Main Range and Darling Downs formerly covered also the Fassifern district, and that the streams were first formed on their surface. The comparative shortness of the east-flowing streams has enabled them to grade down their valleys to the softer rocks below the basalt, and thus lead to the great difference in levels on the two sides of the main Divide. Many writers have attributed this difference to a block faulting, but denudation is the simpler explanation.

Mt. Edwards thus forms the key to the physiographic problem, and supports Mr. J. H. Reid, who pointed out on structural grounds that the fault theory was inconsistent with the geological mapping.

BOTANY, MOUNT EDWARDS AND DISTRICT.

(A) GENERAL.

By C. T. WHITE, Government Botanist.

The camp was pitched in open forest country bordering on Reynolds Creek. The surrounding country was timbered mainly by Eucalypts of different species, notably *E. tessellaris*—Moreton Bay Ash, *E. creba*—Narrow-leaved Ironbark, *E. microcorys*—Tallow-wood, and *E. acmenoides* var. *carnea*—the Yellow Stringy-bark. On the rocky slopes of Little Mount Edwards, *E. exserta* in dwarfed trees was very common. As undergrowth *Leptospermum microcarpum* formed dense thickets. On the flats *Angophora subvelutina*—Apple Tree—was abundant.

Along the banks of Reynolds Creek typical trees were *Callistemon viminalis*—Red Bottle-brush, *Melaleuca bracteata*—River Tea-tree, *Casuarina Cunninghamiana*—River Oak, *Acacia decurrens* var. *pauciglandulosa* in full flower, *Acacia Maidenii* and *Notelaea longifolia* var. *velutina* (only a few trees seen).

In the rain forest clothing the slopes of Mount Edwards Gorge, the commonest tree was the Hoop Pine—*Araucaria Cunninghamii*. Further up towards the mountain the rain forest again gave way to open forest, and on

the rocky cliffs on the higher part of the mountain an interesting find was *Eriostemon difformis* in great abundance.

On Saturday most of the party climbed Mount Greville. The rocky, trachytic slopes would probably carry a number of bright flowers in the spring. An interesting find was a *Westringia*, apparently a form of *W. rosmariniformis*, forming with *Bossiaea rupicola* regular thickets on the ridges. On the rocky cliff faces several specimens of a *Phebalium*, probably representing a new species, was discovered. Most of the party made the ascent of the mountain up a cleft or rain forest gorge in which Piccabin Palms—*Archontophoenix Cunninghamiana*, and the Tall Tree Fern—*Alsophila exeelsa*—were the main scenic features of the forest. Both were remarkable on account of their extreme height. Festooning the trees and clambering over the rocks the Pepper Vine or Festoon Climber—*Piper novae-hollandiae*—was extremely abundant.

The region would well repay a visit during the spring months, and I hope to do this and have some interesting finds to bring before one of the Club's meetings.

BOTANY OF MOUNT EDWARDS AND DISTRICT.

(B).—NOTES ON THE GRASSES OF THE MT. EDWARDS DISTRICT.

*By S. L. Everist, Botanical Branch, Department of
Agriculture and Stock, Brisbane.*

The grasses of the Mt. Edwards District provide quite an interesting study. From observations made during the four days of the trip over sixty species were recorded, and this total could, no doubt, be considerably increased by further study.

From the grass point of view the most interesting find was *Aristida spuria*, a Spear Grass with very early leaves which was quite common on both sides of the Reynolds Creek Gorge, though it was more plentiful on the southern side than on the northern. So far as we know this grass has only previously been recorded from Castle Hill, near Townsville, and this record extends its range very considerably. However, careful search in other districts would probably reveal its presence.

The grasses of the district may be treated under five main headings, viz.:—

1. those of the creek beds and banks
2. those of the flats and foothills
3. those of Mt. Edwards

4. those of Mt. Greville
5. those of Reynolds Creek Gorge.

In those situations included in the first category we have the very conspicuous *Pennisetum compressum* sometimes known as Swamp Foxtail. This was common near the camp, but I noticed very little further downstream, though it was quite plentiful further upstream. Much more widely distributed but perhaps not so conspicuous is *Optismenus compositus*. This creeping grass forms quite extensive mats on the banks, particularly in the shade of the *Callistemon* trees. A few plants of Burr Grass (*Cenchrus australis*) were seen also in such situations, and on small islands in the stream itself.

In the damper places, *Paspalum distichum*, the Water Couch, forms a large part of the ground covering, and at times extends into the water. *Brachiaria foliosa* occurs here and there as does also a species of *Eriochloa*. Two species of *Paspalidium* are met with fairly frequently along the creek banks, and in such situations, also Blue Couch (*Digitaria didactyla*), makes its appearance. Just above the Reynolds Creek Gorge is a patch of Rice Grass (*Leersia hexandra*), and associated with it is *Paspalum dilatatum*.

Forming the great bulk of the vegetation of those situations which come under the second heading are a number of grasses, chiefly Bitter Blue Grass (*Amphilophis decipiens*), Blue Grass (*Dichanthium sericem*), and a number of three-awned spear grasses, notably *Aristida glumaris*, *A. calycina*, *A. vagans*, *A. ramosa* and *A. gracilipes*. *Paspalum dilatatum* occurs in parts. Scented Top (*Capillipedium parviflorum*) and Blady Grass (*Imperata cylindrica* var. *Koenigii*) are common, particularly along the edges of paddocks on the flats. Barbed Wire Grass (*Cymbopogon refractus*) and *Hyparrhena filipendula* are scattered throughout these flats and on the hills between Mt. Edwards and Mt. Greville, while the Love Grasses, *Eragrostis diandra* and *E. elongata*, form inconspicuous tufts among the Spear Grasses. Paddock Love Grass (*Eragrostis leptostachya*) and Weeping Love Grass (*Eragrostis parviflora*) are rather important constituents of the grass flora of the flats and low hills. Bunch Spear Grass (*Heteropogon contortus*) is not particularly common, but occurs in isolated clumps here and there. Along the roadsides and on the hills *Chloris divaricata* grows fairly freely. On cultivation headlands and in other places where the ground has been disturbed we find *Amphilophis intermedia*, while on the site of the camp itself conspicuous clumps of Pigeon Grass (*Setaria*

glauca) were present. *Panicum effusum* is scattered fairly plentifully throughout the flats and on the slopes, and extends a considerable distance up the mountain.

On the lower slopes of Mt. Edwards the grasses chiefly consist of a mixture of *Aristida glumaris*, *A. ramosa*, *A. vagans*, and *A. calycina*, Kangaroo Grass (*Themeda australis*) and Barbed Wire Grass (*Cymbopogon refractus*), with *Hyparrhenia filipendula* scattered throughout. An interesting find on these slopes was *Chrysopogon sylvaticus*, which is not plentiful outside the Brisbane District. Here the Kangaroo Grass is by no means dominant, whereas on the lower slopes of Mt. Greville we find a vast amount of Kangaroo Grass, with the other grasses occupying a more or less secondary position. On Mt. Edwards *Amphilophis decipiens* and *Panicum effusum* extend a fair way up the slope.

Ascending this mountain Barbed Wire Grass gradually becomes dominant, while *Aristida glumaris*, *A. vagans* and *A. calycina* tend to disappear. Here and there are found patches of a small ereeping *Digitaria* not unlike Blue Couch but quite distinct from it. *Paspalidium distans* and a *Paspalidium* allied to *P. gracile* are present in small clumps, while further on *Paspalidium gracile* var. *rugosum* makes its appearance.

Nearly half way up the mountain was discovered a patch of a pale green, very hairy *Paspalidium*, which has been much eaten by stock. Above this commences a large patch of second growth Brush Box trees, which form fairly dense undergrowth, but still leave sufficient room for a number of grasses. Meadow Rice Grass (*Microlaena stipoides*), *Chloris ventricosa*, *Eragrostis elongata*, *Eragrostis leptostachya* and Rat's Tail Grass (*Sporobolus elongatus*) are all found here as well as a very tall spear grass which I take to be a form of *Aristida ramosa*. *Digitaria parviflora*, *Dichelachne micrantha*, and a species of *Entolasia* are also fairly plentiful. A conspicuous grass in these thickets is *Aristida gracilipes*, particularly in those places where fire has done its work.

On the higher slopes of Mt. Edwards, Kangaroo Grass reappears in association with Barbed Wire Grass, and these two are the only grasses of any importance in such situations.

On the lower slopes of Mt. Greville, Kangaroo Grass (*Themeda australis*) makes up a very large proportion of the ground covering. Barbed Wire Grass (*Cymbopogon refractus*), *Aristida glumaris*, *A. vagans*, *A. gracilipes* and *A. ramosa* are associated with it as well as isolated patches of *Heteropogon contortus*. *Hyparrhenia filipendula* is also fairly well distributed on these slopes.

It will be seen that*although the species on the lower slopes of both Mt. Greville and Mt. Edwards are essentially the same their relative importance is quite different.

In the rain-forest in the gorge grasses are not at all common, and the only species observed was *Panicum pygmaeum*.

On the slopes above the gorge most of the species of the lower slopes occur, but with the important addition of *Poa caespitosa* var. *australis*. On the higher slopes all the grasses except this *Poa* disappear until just below the summit it is practically the only species present. However, two species of *Stipa* make their appearance near the top of the mountain. One of these has flowering culms up to about 5 feet high.

The grass flora of the Reynolds Creek Gorge is interesting. The southern slope is covered to a large extent by *Aristida spuria*, with which on the higher slopes is associated *Panicum uncinulatum*, *Aristida ramosa* and *A. gracilipes*. Growing in crevices on the bare trachyte slopes just above the water are quite a number of species, including *Chloris ventricosa*, *Dichanthium affine*, *Amphilophis decipiens*, *Eragrostis parviflora*, *Eragrostis diandra*, *Heteropogon contortus*, *Pappophorum nigricans* var. *arenicolum* and *Brachiaria foliosa*.

Above the pine forest on the northern side of the gorge we find *Panicum uncinulatum*, *Entolasia* sp. and *Chloris unispicea*, while on the creek flats at the bottom are *Oplismenus compositus* and a small *Paspalidium*.

MOUNT EDWARDS: EASTER CAMP, 1934.

BIRD NOTES.

By G. H. BARKER, Hon. Secretary for Queensland,
R.A.O.U.

The Mt. Edwards camp site was an ideal one from many points of view, but particularly from that of the bird observer. The beautiful Reynolds Creek on the banks of which our tents were pitched formed an ideal sanctuary for the many birds of the area. Consequently practically 90 per cent. of the birds observed during our stay were noted close to the actual camp site. From early morning till it was quite dark different birds were in evidence from hour to hour. Our old friends, the Laughing Kookaburras, started with the first streaks of dawn, beating the farmers' poultry in their self-appointed task of waking the countryside to a new day. Also well after sundown they were the last bird voices to be heard as the night closed in; there were plenty of them, too. Quite a

collection of noisy miners were also early risers, and a company of these birds would cross the camp site early each morning from the timber to the creek, playing chasings from tree to tree. By this time the rich flute-like notes of the Magpies and the black and white Butcher Birds, perched on the tall, dead trees in the clearing would be heard from all sides of the camp. As the sun rose all and sundry felt the urge to join in a sort of "jolly good fellow" to the great yellow God and Honeyeaters, Parrots, Whistlers, Finches, Wrens and other birds too numerous to mention could be heard in solo parts in this early morning hymn of praise.

As the day advanced and the day's foraging started, the choir practice became less obvious, especially as this is the autumn season and the joyousness of spring was not there to urge the maintenance of song that is usual at that time. All the same there was hardly a minute during the day that some bird or other did not announce its presence with a distinctive note that would catalogue it at once. In a cornfield in the next paddock could be found at any time wrens, finches, rosellas, noisy miners, magpies and butcher birds, whilst over it skimmed welcome swallows and fairy martins. In the trees along the creek birds of all kinds could be found all through the day. Honeyeaters were especially in evidence, Lewins, yellow-cheeked, blue-faced, white-naped, little brown, both friar birds and the spinebill. Others there were both whistlers and the shrikethrush, flycatchers, honey parrots, kingfishers, warblers, tits, dabblers, and others. In the creek itself we found cormorants, ducks, grebes, coots, herons and plovers.

Excepting for the presence of ducks and grebes in the creek there was nothing unexpected in the list of 65 listed during the outing, the principal features being the numbers to be seen or heard during our stay.

QUEENSLAND NATURALISTS' CLUB: EASTER CAMP-OUT AT MT. EDWARDS, 1934.

LIST.

10. *Coturnix pectoralis*: Stubble Quail.
30. *Geopelia placida*: Peaceful Dove.
32. *Geopelia humeralis*: Bar-shouldered Dove.
59. *Fulica atra*: Coot.
- 60(?) *Podiceps* (sp.?): Grebe (a bird in immature plumage).
100. *Microcarbo melanoleucus*: Little Pied Cormorant.
133. *Lobibyrx novae-hollandiae*: Austn. spur-winged Plover.

174. *Burhinus magnirostris*: Southern Stone Curlew.
188. *Notophoxyx novae-hollandiae*: White-faced Heron.
192. *Nycticorax caledonicus*: Nankeen Night Heron.
208. *Anas superciliosa*: Black Duck.
215. *Nyroca australis*: Aust. White-eyed Duck.
224. *Uroaetus audax*: Wedge-tailed Eagle.
242. *Ninox boobook*: Boobook Owl.
256. *Trichoglossus chlorolepidolus*: Scaly-breasted Lorie-keet.
260. *Glossopsittacus pusila*: Little Lorikeet.
282. *Platycercus elegans*: Crimson Rosella.
286. *Platycercus adscitus*: Palcheaded Rosella.
319. *Alcyon azurea*: Azure Kingfisher.
322. *Dacelo gigas*: Laughing Kookaburra.
329. *Merops ornatus*: Rainbow Bird.
338. *Cacomantis flabelliformis*: Fan-tailed Cuckoo.
357. *Hirundo neoxena*: Welcome Swallow.
358. *Cheramoecca leucosterna*: White-backed Swallow.
361. *Rhipidura flabellifera*: Grey Fantail.
362. *Rhipidura rufifrons*: Rufous Fantail.
364. *Rhipidura leucophrys*: Willie Wagtail.
365. *Myiagra rubecula*: Leaden Flycatcher.
369. *Seisura inquieta*: Restless Flycatcher.
373. *Monarcha melanopsis*: Black-faced Flycatcher.
377. *Microeca fascians*: Brown Flycatcher.
398. *Pachycephala pectoralis*: Golden Whistler.
401. *Pachycephala rufiventris*: Rufous Whistler.
408. *Cotturicincla harmonica*: Grey Shrike-Thrush.
415. *Grallina cyanoleuca*: Magpie-Lark.
424. *Coracina novae-hollandiae*: Black-faced Cuckoo-Shrike.
429. *Edolisoma tenuirostre*: Jardine's Caterpillar-Eater.
445. *Pomatostomus superciliosus*: White-browed Babbler.
453. *Gerygone olivacea*: White-throated Warbler.
486. *Acanthiza chrysorrhoa*: Yellow-tailed Tit.
529. *Malurus cyaneus*: Superb Blue Wren.
536. *Malurus lamberti*: Variegated Wren.
558. *Climacteris leucophaea*: White-throated Tree-Creeper.
565. *Pardalotus punctatus*: Spotted Pardalote.
569. *Pardalotus melanoccephalus*: Black-headed Pardalote.
574. *Zosterops lateralis*: Grey-breasted Silvereye.
578. *Melithreptus lunatus*: White-naped Honey-eater.
586. *Myzomela sanguinolenta*: Scarlet Honey-eater.
591. *Acanthorhynchus tenuirostris*: Spinebill.
597. *Gliciphila indistincta*: Brown Honey-eater.
605. *Meliphaga Lewini*: Lewin Honey-eater.
614. *Meliphaga chrysops*: Yellow-faced Honey-eater.
634. *Myzantha melanocephala*: Noisy miner.

- 641. *Entomyzon cyanotis*: Blue-faced Honey-eater.
- 645. *Philemon corniculatus*: Noisy Friar Bird.
- 646. *Philemon citreogularis*: Little Friar Bird.
- 647. *Anthus australis*: Australian Pipit.
- 655. *Steganopleura bichenovii*: Double-bar Finch.
- 662. *Aegintha temporalis*: Red-browed Finch.
- 673. *Chibia bracteata*: Spangled Drongo.
- 690. *Corvus coronoides*: Australian Raven.
- 694. *Strepera graculina*: Pied Currawong.
- 700. *Cracticus nigrogularis*: Pied Butcher Bird.
- 702. *Cracticus torquatus*: Grey Butcher Bird.
- 705. *Gymnorhina tibicen*: Black-Backed Magpie.

ENTOMOLOGY AT MT. EDWARDS.

By F. A. PERKINS, B.Sc.Agr., Department of Biology,
Queensland University.

Although Easter came early this year, insects were by no means plentiful at the Easter Camp at Mt. Edwards. The Odonata (dragon-flies) were an exception, probably because of the prolonged wet season, and, as the camp was located right alongside Reynolds Creek, near the entrance of Mt. Edwards Gorge, they received special attention. The outstanding species from a Brisbane collector's point of view was *Dipblebia nymphoides*, of which three males and one female were seen. The beautiful bright blue male was most conspicuous, usually resting on the small rocks in the centre of the stream where it was most difficult to stalk. A very common species was *Pseudagrion aureofrons*, a very pretty damsel fly with golden head and prothorax and blue markings on the abdomen. It was more abundant on the larger pools where it could be seen flying close to the water, or resting on the broad leaves of the water. The black and orange *Neosticta solida* was plentiful, usually resting on the reeds in sheltered situations along the river bank. Of the Libellulidae the most abundant were the bluish grey *Orthetrum calcedonicum*, the dark red *O. villodovittatum*, the bright red male and yellow female of *Diplacodes haematodes*, and the black and yellow *Nannophlebia risi*. *Hemicordulia tau* and *Austrogomphus* sp. were also very common in the open forest.

On beating the foliage of the trees and shrubs along the river bank two specimens of *Stenosialis australis* were discovered. This insect, the only representative of the family in Queensland, is rather rare. By the same method three species of Mayflies, including the common *Atalophlebia costalis*, were collected, also a number of

Copeognatha and one Stone-fly. This Stone-fly *Trinotoperla australis*, has not hitherto been recorded from Queensland though taken occasionally in N.S.W.

Hymenoptera were not very plentiful, the commonest species being *Eumenes latreillei*, *E. servillei*, *Anthophora pulchra*, *Sceliphron laetum* and *Scolia verticalis*, all well known Brisbane species.

Some interesting Chalcid and Ichneumon not yet identified were bred from galls in the fruits of the Lilly-pilly (*Eugenia Smithii*).

A rather unusual form of the common grasshopper with the two white longitudinal lines down the back (*Eumacrotoma securiformis*) was found in the gorge. The hind tibiae and part of the hind femora were blood red in colour and most conspicuous.

The beetles, bugs, flies, and moths received very little attention and appeared to be rather scarce. Most of those observed were common Brisbane species.

RECORDS OF QUEENSLAND FUNGI.—I.

By D. A. HERBERT, D.Sc., Department of Biology,
University of Queensland.

This list is supplementary to that given in F. M. Bailey's comprehensive catalogue of Queensland Plants. It does not contain the names of numerous pathogenic fungi which have been recorded from time to time in the literature issued by the Department of Agriculture and Stock by such authors as H. Tryon, J. H. Simmonds, R. B. Morwood and L. F. Mandelson, and which are included in the Departmental card index of Queensland Plant Diseases.

Phycomycetac.

Albuginaceac—

Albugo bliti (Bivona) O. Kuntze, on *Amaranthus viridis*, Woolloowin.

Albugo Portulacac (D.C.) O. Kuntze, on *Portulaca oleracea*. (Coll.: T. H. Strong.)

Indooroopilly, April-May, 1932; Biloela, Jan.-Feb., 1933. Affected plants ascendent.

Peronosporaceac—

Peronospora effusa (Grev.): Rabenhorst, on *Chenopodium album*. Agricultural College, Gatton. 23/10/33.

Peronospora trifoliorum: De Bary, on *Medicago sativa*. Downy mildew of lucerne. St. Lucia Farm School, 15/9/33.

Peronospora viciae (Berk) De Bary, on Sweet Pea (*Lathyrus odoratus*). Brisbane Botanic Gardens, 15/7/31.

Entomophthoraceae—

Empusa Muscae: F. Cohn. Commonly killing house-flies in Brisbane. This species has been recorded in entomological literature by Weddell.

Basidiomycetae.

Ustilaginaceae:

Cintractia columcllifera (Tul.) McAlp. on *Andropogon sericeus*. Agricultural College, Gatton, 3/5/31.

Ustilago cynodontis P. Henn. on *Cynodon dactylon* (Indian Couch Grass). This may be found at all times of the year round Brisbane, but is particularly common in spring and early summer.

Ustilago olivacea D.C., on *Carex pseudocyperus*. Kuraby, 19/12/27.

Pucciniaceae—

Uromyces phaseoli (Pers.) Winton on *Phaseolus vulgaris*. Rust of French Bean, common in Brisbane.

Puccinia poarums Nielsen, on *Poa annua*. Fairly common in Brisbane in spring.

Puccinia granularis Kalchbrenner and Cooke. "Geranium rust." Common on Pelargonium, Pelargonium zonale.

Puccinia chrysanthemi Roze, on *Chrysanthemum indicum*. Common in Brisbane.

Puccinia magnusiana Koernicke, on *Phragmites communis*. (Coll.: S. T. Blake and C. G. Greenham.)

Puccinia violae (Schum.) D.C., on cultivated violet.

Puccinia aucta: Berkeley and F. v. Mueller on *Pratia excelsa*. Agricultural College, Gatton, 10/10/33. The accidial stage alone was found in this material.

Puccinia cynodontis Desmazieres, on *Cynodon dactylon*.

Deuteromycetae.

Septoria dianthi: Desm. Recorded from carnation by Bailey. Common on other cultivated species of *Dianthus*.

Septoria apii (Br. & Cav.) Rostrup. On *Apium graveolens*. Brisbane, 6/8/31. (Coll.: S. Marriott.)

Thielavia basicola Zopf, on Sweet Pea. Coll.: J. G. Shaw), Kangaroo Point, 21/7/31. This species is common in Brisbane on a wide range of hosts.

Sclerotium Rolfsii Sacc. Common in Brisbane, attacking a wide range of hosts (asters, carnations, snapdragons, potatoes, etc.). We have controlled this disease by saturating the soil with a solution of copper sulphate (1 lb. to 7 gallons), the approximate amount necessary being $1\frac{1}{2}$ gallons per square yard.

BIRDS OF THE BUNYA MOUNTAINS.

By J. E. Young.

In the following remarks I wish not merely to make a list of the birds seen on the Bunyas, but to discuss to some extent the difference in the varieties of the birds seen on the Mountain and those on the lower lying scrub and plain surrounding; though my own observation would naturally not be of an exhaustive nature.

First I should perhaps mention something of the comparative elevations above the sea level and general topography of the district.

The Bunyas extend for a few miles, about ten, being of considerable height, and are somewhat irregular in width with a number of offshoots, the whole rising rather abruptly from the surrounding Downs country, and it is principally covered with "Scrub" or "Rain Forest" with occasional open grass patches or forest areas of varying density and size.

The altitude of the higher peaks is a little over 3,600 feet. The average of the upper portions being probably something over 3,000 feet.

In the Downs country below, we have Dalby, 1,123 feet, to the southward, and Kingaroy in the opposite direction, 1,417 feet. Bell lying much nearer, being 1,569 feet.

This gives a difference of roughly 2,000 feet of elevation on the mountain above the surrounding country.

Travelling with Mr. Nebe, one of our members, in early October, we spent about three days in the vicinity of Kingaroy at a property of his, in the Coolabunnia Scrub, which now, however, is mostly felled, but where bird life we found to be both abundant and varied; though naturally the forest haunting species much predominated.

Leaving Kingaroy after lunch on a Saturday afternoon, we turned off the Porter's Gap Road, after passing Kumbia and after reaching the foot of the Range, followed a quite new road up to the northern end, this road being very steep and by no means one of the best.

Our first camping spot was reached at Burton's Well, just in time to fix tent before dark. Here we had splendid water, a fine outlook, and a good centre to work from.

While staying here, we climbed Mt. Kiangarow, 3,608 feet, the upper part being covered with grass and also scattered wattles and grass trees. From here we could see past Kingaroy in the N.E., its peanut silo being plainly visible at 30 miles, with Dalby in the opposite direction almost as far, and Porter's Gap road visible to the N.W.

The principal birds noted while at this camp were:—Shrike Tit, Little Green Pigeon, Cat Birds (numerous), Flame Robin, Podargus, Boobook Owl, Satin Bower Bird, Grey Thrush and also a Scrub Wren I shall refer to later.

On Tuesday we moved to a spot near Mowbullen House, working thence in different directions, all the time being spent on long walks and taking photos, except Thursday, which was wet, so that bird study did not occupy all our time.

On the Friday afternoon the change in the varieties of birds was particularly noticeable after reaching the foot of the range, when no less than 14 varieties were noticed in a short time, which had not been seen on the range; I have marked these with an asterisk in my accompanying list.

The list of birds which were noted both on the range and also below was comparatively small, being only 15.

Of these few the Black Faced Flycatcher is one which is found in the sea coast scrub as well as nearly 4,000 feet up on the Roberts Plateau, while of the others the Kookaburra, Whip Bird, Yellow Rumped Tit Warbler, Magpie, Pipit, Raven, Grey Thrush and Scrub Magpie are fairly ubiquitous.

The Striped Honey Eater, a purely inland bird, is common in both the Kingaroy and Jondaryan districts, but was only heard once and not seen, on Mowbullen, the voice, however, is so distinctive as to be undoubted, and I knew it at once, though I had not heard it for years.

A Robin which I saw was, I believe, the Flame Robin, but I only glimpsed it at Coolabunnia and on two occasions on the Bunyas, little time being given to identify it exactly, owing to its rapid movements.

The Coach Whip Bird, not so frequent now in Coolabunnia owing to the decreasing shelter, was abundant on the ranges; in fact, I never remember so many of these

being seen and heard as there; they were calling all around one, and probably six or eight within little more than 100 yards; they were also very tame, frequently coming out into view and not being much alarmed at seeing human beings near. I even watched them scratching close to me on the ground, and at times on the tree limbs where they appeared to aid nature by feverishly tearing off large quantities of loose bark, lichens, etc., in their search for insects.

The Regent Bird was only once seen on the mountain, possibly owing to the density of the vegetation, but came each day at Coolabunna to feed on a large, old mulberry tree, the male being very timid.

Amongst the 28 birds noticed only on the Bunyas, I was pleased to see quite a number of the Topknot or Flock Pigeon, that fine scrub-frequenting and fruit-eating bird, in pairs and small flocks. I can remember the time when I have seen these birds pass over Southport in large flocks, and when they banked or turned together, would create a roar with their wings, which without exaggeration could easily be heard a mile away. I trust that our parks will prove large and numerous enough to enable this fine bird to hold its own.

The Wongas and Pheasant Pigeons appeared to be fairly numerous, but the Scrub Turkey by no means so, possibly owing to the local sports.

The Boobook Owl and Podargus were only heard.

A pair of Shrike Tits were seen at play, and later one was detected taking nesting material, but unfortunately could not be followed to its nest and was not seen again.

A pair of Striated Tit Warblers were found busily making a home in the scrub; a rough hanging eyliner, about 9 or 10 inches long and $1\frac{1}{2}$ inches across, made of cobweb or other soft, whitish material.

Satin Bower Birds are fairly common, and a Bower was come across whilst taking a photo of an orchid; I was informed that these birds are frequently shot by a resident whose fruit they eat.

The Spine Bill was not much in evidence, but would probably be more so when the grass and other trees come in blossom.

A Wedge-tail Eagle flew into a tree beside us at the head of a waterfall, and hurriedly left again on seeing us.

Two other birds I particularly wish to mention, both seen in the scrub.

One appeared to be a somewhat smaller edition of Jacky-winter, but perhaps more grey and bright looking; his presence in the scrub, though not far from the forest,

seemed to me somewhat remarkable. Leach mentions two birds somewhat answering to the description, though not for this part of Australia, nor is scrub mentioned as habitat in any case.

The other instance was that of a pair of Scrub Wrens, similar to the white-browed one, except that they both had lemon yellow throats and brows, in place of white, the latter variety being also common in the locality.

One bird I was surprised at not finding any trace of on the mountain was the Pitta, none being seen nor any trace of their presence in the shape of broken shells, as is the case in so many scrubs, though the shell *Pedinogyra* was frequently seen, and a live specimen was taken.

The matter of locality in regard to the various birds noticed is somewhat interesting, and I imagine that altitude has either a direct or indirect bearing on the subject.

Altitude being equivalent to climate will have an influence on the flowering times of different kinds of plants, which will, of course, affect the supply of insect life on the blossom and also of the fruit, both of which form the natural food supply of many, or perhaps I should say, all of these birds.

Amongst other considerations, possibly some of those birds seen below the range may be restricted owing to elevation itself, or by reason of its being mostly scrub or rain forest on the mountain, and not favoured by many for that reason, such, for instance, being: *The Bar-shouldered and Peaceful Doves, Crested and Bronzewing Pigeons, Quarrion, Sacred Kingfisher, Wagtail, Restless Flycatcher, Butcher Birds, Noisy Miner, Apostle Bird, Chough, etc.*

One very regrettable circumstance connected with this area of country is the fact that certain portions of land have been alienated, there being already several houses on the top, with their clearings, and in addition there are certain selections on the eastern slopes, from which the pine has already been partly removed, and it is expected that when it is all gone the land will be cleared for farms, thus largely restricting the areas available for sanctuary, as well as increasing the danger of destruction of wild life by the larger number of permanent settlers, who will be then living right alongside the Park portion, such persons being very prone to take the week-end off in the scrub with a gun, both for pleasure and as a means of adding to the larder supplies.

My lists, which would probably be increased by longer and more careful search, especially at other times, I append herewith.

List of Birds seen or heard on the Bunya Mountains only, 7th—13th October, 1933:—

- | | |
|---|---|
| 1 Scrub Turkey | 16 Mountain Thrush |
| 2 Top-knot Pigeon | 17 Tree Tit |
| 3 Little Green Pigeon. | 18 Striated Tit Warbler,
building in scrub. |
| 4 Wonga Pigeon | 19 Scrub Wren, white
brow. |
| 5 Pheasant Pigeon | 20 Scrub Wren, similar
to above but with
lemon yellow throat
and eye-brow, one
pair seen. |
| 6 Wedge-tail Eagle | 21 Shrike Tit, building. |
| 7 Grey Goshawk or
Falcon? | 22 Golden Whistler. |
| 8 Boobook Owl | 23 Yellow Shrike Robin |
| 9 Lowrie or Crimson
Rosella | 24 Silver-eye |
| 10 King Parrot | 25 Spinebill, H.E. |
| 11 Podargus | 26 Red-browed Finch. |
| 12 Cuckoo, Square Tail? | 27 Satin Bower Bird |
| 13 Flycatcher, like small
Jacky-winter, in
scrub. | 28 Cat Bird |
| 14 Grey Fantail | |
| 15 Rufous Fantail | |

The following Birds were observed on the Bunyas as well as below the range during the same outing:—

- | | |
|-------------------------------|----------------------------------|
| 1 Kookaburra | 7 White-throated Tree
Creeper |
| 2 Flame Robin (prob-
ably) | 8 Lewin Honey-eater |
| 3 Black-faced Fly-
catcher | 9 Striped Honey-eater |
| 4 Coach Whipbird | 10 Pipit |
| 5 Yellow Rump Tit
Warbler | 11 Raven? Crow |
| 6 Black-backed Magpie | 12 Grey Thrush |
| | 13 Regent Bird |
| | 14 Blue Wren |
| | 15 Scrub Magpie |

The following were observed only below the range, mostly near Kingaroy, or directly after descending towards Jondaryan the latter being marked with an asterisk:—

- | | |
|----------------------------------|--|
| 1 Bar-shouldered Dove | *11 Fairy Martin |
| 2 Peaceful Dove | *12 Willie Wagtail |
| *3 Crested Pigeon | 13 Leaden Flycatcher |
| *4 Bronzewing Pigeon | *14 Restless Flycatcher |
| 5 Kestrel | 15 Black-faced Cuckoo
Shrike |
| *6 Yellow-head Rosella
(many) | 16 White-shouldered
eaterpillar-eater |
| *7 Quarrior | *17 Babbler |
| 8 Sacred Kingfisher | *18 Magpie Lark |
| *9 Welcome Swallow | |
| 10 Jacky Winter | |

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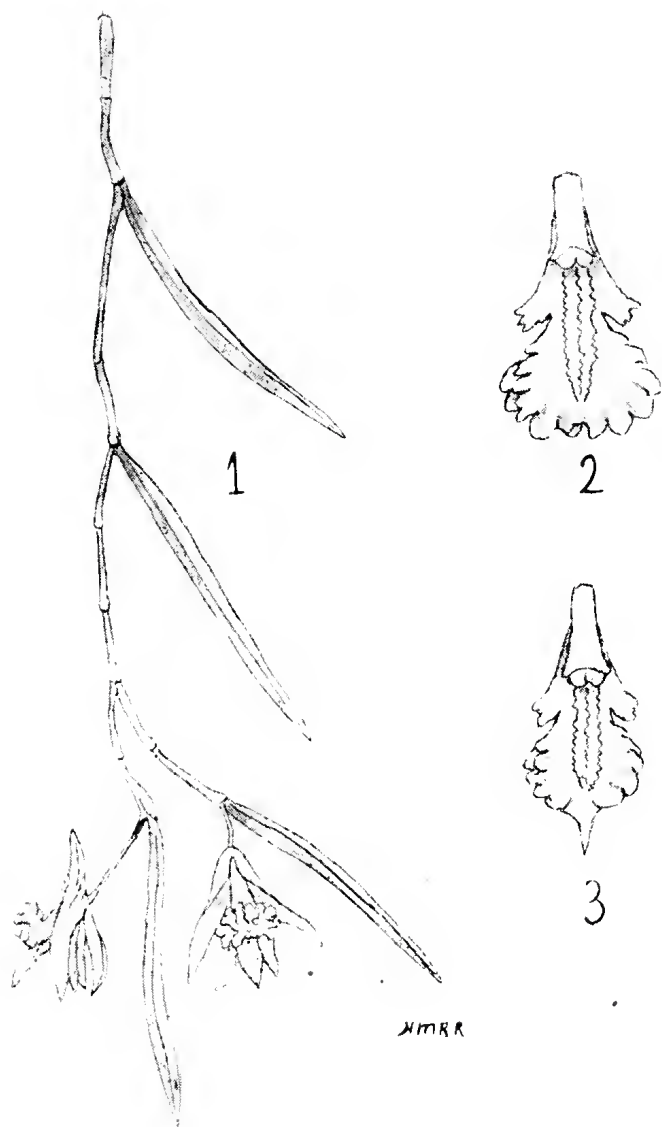
NOTES ON CERTAIN SPECIES OF DENDROBIUM.

(By the Rev. H. M. R. RUPP, Woy Woy, N.S.W.)

In April of the present year, Mr. K. Macpherson, of Proserpine, sent me several plants under the name *Dendrobium Mortii* F.v.M. The flowers were just withering, but within six weeks a second lot appeared. This is characteristic of *D. Mortii*; but as neither flowers nor leaves were completely identical with the species as known to me, I decided to investigate. I found that the Proserpine orchid agreed precisely with Bailey's description of Benthams *D. Bowmanii*. Benthams himself (*Fl.A.* vi., 286) described the flowers as "apparently white," but colour-descriptions of dried specimens cannot be depended upon.

Now Benthams (*loc. cit.*) treated *D. Mortii* and *D. Beckleri* F.v.M. as conspecific, and suppressed the latter. With all due respect to the great botanist, I venture to say that no one who has seen and handled these plants in the living state could possibly endorse this treatment of them. It appears to me that Benthams's description of what he calls *D. Mortii* is a description of the plant of *D. Beckleri* and the flower of *D. Mortii*. As I write, I have before me Mueller's specimens, kindly sent by the Melbourne National Herbarium authorities. They bear out my contention that Benthams confused the material, and mistakenly suppressed *D. Beckleri*. It would be difficult to do otherwise with these specimens unless one was acquainted with the plants in life. Having disposed of *D. Beckleri* and described its flowers under the impression that they were those of *D. Mortii*, Benthams seems to have decided that certain specimens from the Bersaker Range, near Rockhampton, labelled by Mueller *D. Mortii*, were not that species. Accordingly he named them *D. Bowmanii*. I do not think there can be any doubt that Mueller was right. His specimens appear to me identical with the Proserpine plant of 1934; and the differences between this and the typical *D. Mortii* are certainly not of specific value. The leaves are slightly more robust and sulcate; the spur of the flower is a trifle longer, and the labellum is more obtuse. Mueller also had this form from Port Denison, which adjoins Mr. Macpherson's locality.

After reaching the above conclusions, I made the belated discovery that R. D. Fitzgerald expressed the same view long ago in *Anstr. Orch.* vol. i. (*D. Beckleri*),



***Dendrobium Mortii* F. v. M. (*D. Bowmanii* Benth.).**

1. Portion of Flowering plant, natural size.
2. Labellum and column from above, enlarged, and labellum flattened.
3. Similar view of labellum and column of *D. Mortii* F. v. M. The apiculate apex is often shorter than this.

and his opinion was endorsed in a footnote in Maiden and Betche's "Census of N.S.W. Plants" (1916). With these authorities behind me, I do not hesitate to say that *D. Bowmanii* is no more than a form of *D. Mortii*. Had it not been for Bentham's mistake, I doubt whether it would have received even varietal recognition.

Among Mueller's specimens is a form from the sources of the Condamine River, labelled and described by him as *D. Robertsii*. As far as I can ascertain at present, this description was never published, and I had not previously heard of it. Examination of the specimens (which are in better condition than any others in the collection) has convinced me that this is identical with the plant described by me (Proc. Linn. Soc. N.S.W. lii. 4, 1927) as *D. tenuissimum*. The description and figures indicate adequately. I think, that the plant is specifically distinct from both *D. Beekleri* and *D. Mortii*. Mueller says (translation from Latin): "In rocky, wooded mountains at the source of Condamine's River: Hartmann; I have examined a cultivated specimen from the grounds of J. Roberts." Several other fragments in Mueller's folios seem to me to belong to this species, which is characterised by extremely slender stems furnished at the joints with very long, persistent, almost capillary bracts. Should it be established that Mueller's description was ever published, of course, the name *D. Robertsii* must supersede *D. tenuissimum*. In any case, publicity should be given to the fact that the Baron, as far back as 1883, recognised the specific rank of this Queensland-New South Wales *Dendrob.*

It was never described in any publication. HURRA.

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PROCEEDINGS.

EVENING MEETING, MONDAY, JULY 16th, 1934.

—The President, Mr. E. W. Bick, occupied the Chair and about 40 members and visitors were present. The President expressed thanks to Dr. Malabar for the gift of a book on the National Geographic Magazine. Mr. G. H. Barker read a letter from Mr. F. L. Berney of Longreach showing the necessity for total protection for the Bustard. He moved that the Club should endeavour to see that the Bustard or Plain Turkey was placed on the list of totally protected birds. The motion was seconded by Mrs. Comrie Smith and carried unanimously. The principal business of the meeting was a lecture by Mr. H. W. Herman on Japan. This was illustrated by a superb set of coloured lantern slides and covered many phases of Japanese life.

EVENING MEETING, MONDAY, AUGUST 20th,

1934.—The President, Mr. E. W. Bick, occupied the Chair. Miss E. Marshall and Miss M. Baldwin were elected members of the Club. A lecturette on orchids was delivered by Mr. C. T. White. This was accompanied by a number of slides shown by Mrs. H. Curtis, and a number of photographs taken by Mrs. Curtis shown through the epidiascope. Other photographs were shown by Mr. Nebe and included floral studies and photographs of Bottle Trees. Other exhibits were a stone axe shown by Mrs. Williams, and an Iceland Poppy flower showing prolification, by Mr. J. E. Young. Mr. G. H. Barker read a letter from the Returned Soldiers and Sailors Imperial League which stated that poisonous baits laid for dingoes and distributed by the Prickly Pear Board were responsible for losses in bird life. Mr. Barker said that he had made enquiries from the Board, who stated that the size of the bait prevented its being swallowed by any bird except the emu, and that no reports had reached the Board of any mortality of any account among birds and wild animals other than dingoes. The Board promised to make definite enquiries on the point.

WILDFLOWER SHOW AND NATURAL HISTORY EXHIBITION.

SATURDAY, SEPTEMBER 1st.

The supply of flowers this year was excellent, though specimens were received from a lesser number of exhibitors. The quality of the flowers was good. Public patronage was poorer than for some years past and the financial return in consequence was lower. Specimens of wildflowers were forwarded from Rochedale (Mrs. A. Thomson), the Blunder (Mr. J. E. Young), Chermerside Hills (Mr. G. H. Barker), Coolumb (Mrs. Yabsley), Maroochydore (Mrs. B. A. Latimer), Tewantin (Miss H. Makepeace), Bribie Island (Mr. W. Shirley, Mr. R. and Miss E. Davis), Albert River (Mr. and Mrs. Denis Curtis), Southport (Miss M. Birt), Tugun (Mr. and Mrs. G. H. Barker), Tamborine Mountain (Mr. and Mrs. Herbert Curtis and Mr. M. Davidson), Springsure (Mrs. McLaughlin), Thulimbah (Mrs. Slaughter). Interstate exhibits included one from New South Wales sent by Messrs. Harris and Barnett on behalf of the New South Wales Naturalists Club; Victoria, from Mr. J. W. Andas, on behalf of the Field Naturalists' Club of Victoria; from South Australia, Miss R. Winter and Mrs. Page. Australian plants in cultivation in Queensland were exhibited as follows:—

Chamaelaucium (Mrs. E. Thomson, Rochedale; Mrs. K. Baird, Wellington Point; Mrs. H. Curtis, Tamborine Mountain; Mrs. Gaydon, Childers; and the Curator, Botanic Gardens, Brisbane). *Boronia megastigma* (Mr. Davidson, Tamborine Mountain). *Clianthus Dampieri*, Sturt's Desert Pea (Mr. W. Matheson, South Brisbane). *Chorizema* (Mrs. G. A. Rowley). *Abrus precatorius* in seed (Mr. F. O. Nixon). *Acacia spp.*, a collection of Wattles from Sherwood Forest Park. Native Orchids, *Crotalaria* and *Graptophyllum* (Botanic Gardens, Brisbane). *Pittosporum undulatum* (Mr. J. H. Simmonds).

Natural history photographs were shown Mrs. H. Curtis (general), Mr. R. L. Higgins (hand tinted flower photographs), and Mr. J. Nebe (general photographs and stereoscopic views). Several paintings of native birds were shown by Mr. N. Jack. The thanks of the Club were due to the Department of Agriculture and Stock, to the Queensland Museum and to the Queensland University for comprehensive natural history exhibits. A collection of Australian shells was shown by Mr. J. H. Simmonds and specimens of Southern Queensland butterflies by Mr. D. Curtis. A special exhibit of several different kinds of *Boronia* was arranged by Miss James and Mrs. A.

Thomson. State School prizes were awarded to Landsborough (North Coast Line), Russell Island (South Coast) and Thulimbah (Granite Belt).

EVENING MEETING, MONDAY, SEPTEMBER 17th, 1934.—The Chair was occupied by the President, Mr. E. W. Bick, and 52 members and friends were present. On the motion of Dr. E. O. Marks, seconded by Miss E. N. Baird, Mrs. Leslie Smith, Gregory Ter., Brisbane was elected a member of the Club. The principal business of the evening was a lecture "Imaginary Excursions in Java," by Miss Winifred Ponder. Exhibits included a fine piece of chalcedony by Mr. J. E. Young, a stone axe by Mr. K. Jackson, wild flowers from Tugun by Mr. G. H. Barker, and photographs of Java by Miss Ponder.

EVENING MEETING, MONDAY, OCTOBER 15th, 1934.—The President, Mr. E. W. Bick, occupied the Chair, and about 26 members were present. Reports on the excursion to Beerwah were given by Mr. J. E. Young (botany and general) and Mr. Jack (birds). A series of lantern slides from the collection of the late Mr. G. W. Gauckrodger were screened by Mr. G. H. Barker, who gave interesting notes on the various birds and nests shown. Contributions to the library were laid on the table by Dr. Malaher ("How to Study Birds"), and Mr. G. H. Barker ("Bird Lore").

EVENING MEETING, MONDAY, NOVEMBER 19th—The Chair was occupied by the President, Mr. E. W. Bick, and 52 members and friends were present. A report on birds seen during the excursion to Sandgate Lagoons and Mosquito Creek was read by Mr. Jack. Mr. H. Tilse tabled photographs taken on the excursion. The principal business of the evening was a lecture by the President, Mr. E. W. Bick, on the Islands of Torres Straits. A very fine series of lantern slides showed various scenic and natural history views of the islands. A vote of thanks to the lecturer was proposed by the Chief Protector of Aborigines, Mr. J. W. Bleakley, and carried unanimously.

THE STRUCTURE AND CLASSIFICATION OF QUEENSLAND ORCHIDS.

By C. T. White (Government Botanist).

(Read before the Queensland Orchid Society, 17th August, and the Queensland Naturalists' Club, 20th August, 1934.)

The first question that arises is what is an Orchid? How can we tell an Orchid from other plants? It may be said that plants are divided into two main groups:

- (1) Flowering and seed bearing plants called Phanerogams or Spermatophytes;
- (2) Flowerless and spore-bearing plants called Cryptogams.

This latter group includes the ferns and Lycopods, the highest, to the blue-green algal scum of ponds and to the rusty bacterial scum of bogs and streams which are regarded as the lowest.

Nature has not divided the members of her kingdom into water-tight compartments, but of flowering plants botanists have made two broad divisions which are on the whole readily separable;

(a) Dicotyledons, characterised by the possession normally of two seed leaves in the embryo, and

(b) Monocotyledons, characterised by the possession normally of only one.

The Orchids belong to the latter group. Now what separates the Orchid from other plants? Generally speaking the appearance of the plant is sufficient and we know at first glance that it is an Orchid, but from this alone we cannot be certain, and in popular parlance some Orchids are called Lilies, and some Lilies and allied plants called Orchids. Some Orchids are grass-like in appearance, and even the trained botanist examining plants nearly every day of his life cannot be sure whether the specimen he sees is an Orchid or not without an examination of the flower.

The Monocotyledons are divided up into a large number of families, and it is mainly on the floral characters that these families are differentiated. The flower is the most highly modified part of a plant, and hence it is on characters of the flower that modern botanical classification is built. An ordinary flower consists of a perianth divided into an outer layer called the calyx and an inner called the corolla. The male organs are represented in the centre of the flower by the stamens and the female by the pistil. The parts of the calyx when free from one another are called sepals, and the parts of the corolla, petals. The stamens are divided into two parts, the filaments and the anthers; and the pistil into three parts, the style, the stigma and the ovary. Now the feature that distinguishes the flower of Orchids from those of all other Monocotyledons is the fact that the stamens, the style and stigma are united into one body, usually referred to as the column. The perianth consists of six segments, which is the common number in Monocotyledons, though it is by no manner of means constant. The three outer members of the perianth are generally referred to as sepals. The

back sepals is referred to as the dorsal sepal, the side ones as the lateral sepals. They may be all very much alike, or the dorsal sepal may be markedly different from the lateral ones. The three inner members of the perianth are the petals, and a feature of practically all Orchids is that the lowermost one is very much modified in some way. It is generally lobed and differently coloured to other parts of the flower, and is called the labellum. The one exception to this rule among Queensland Orchids is the genus *Thelymitra*, which contains the Sun Orchids. It is to the labellum that the distinctive beauty of some Orchids is due and this member is an extremely important one in Orchid classification, particularly in the differentiation of species.

The family Orchidaceae or Orchid family is divided into a number of tribes and the tribes into genera, but before dealing with the classification I would just like to outline the main botanical features of the family. As regards habit, they are perennial plants either epiphytic or terrestrial. The term epiphytic, which comes from the Greek *epi*—upon, and *Phyton*—a plant, is perhaps not always applicable, because many of the epiphytic ones as commonly grow on rocks as they do on trees or other plants. Most of the terrestrial ones are tuberous, the tubers mostly being borne in pairs; hence the name Orchid. All the earlier Orchids known to botanists were of this type, for it may be mentioned that the members of the family are not confined to the tropics and subtropics of the world, but are moderately common in England, Continental Europe and the temperate parts of the northern hemisphere generally. The Orchids of the British Isles number approximately forty distinct species or kinds, and when we come to countries such as France, larger and with a more diversified climate the number of Orchid species goes up to 75 or 80. The family is, of course, a huge one and contains more species or different kinds than any other family of flowering plants, the number of described species being somewhere about 20,000. The greatest number are found in countries such as New Guinea, Burma, Sumatra, the Malay States, and allied countries. Some of the more showy sorts come from the Upper Amazonian and Central American Region, but more numerous kinds are known from the tropics of the Old World.

In the epiphytic Orchids the stems are commonly creeping, the creeping part being known as the rhizome. The ascending stems may be swollen as in *Bulbophyllum*, *Dendrobium* and its allies, and are then referred to as pseudo-bulbs, from the Greek *pseudos*—false, and *bolbos*

—a bulb. The roots of epiphytic Orchids serve not only as a means of obtaining nourishment, but as a means of attachment. In some cases they contain chlorophyll, the green colouring matter of plants, and probably perform in part the functions of leaves. The roots of most epiphytic Orchids are enclosed in a spongy sheath termed the velamen (Latin meaning a covering). It is the velamen which gives the white corky appearance to Orchid roots, especially when dried. It is a many-layered, spongy tissue whose function is to suck up rapidly and afterwards hold moisture, to be drawn upon by the plant as required. In some extreme cases such as two peculiar subterranean Orchids, one of which was recently found in Western Australia the other in New South Wales, roots may be entirely absent. The leaves are extremely variable, sometimes being totally absent and only represented by a few scales on the flowering stem as in the common *Dipodium punctatum*, the Spotted or Hyacinth Orchid. In one case, *Taeniophyllum*, there are no leaves of any sort, not even scale leaves, and in this case the roots are green coloured and probably perform in part the functions of leaves, the green colouring matter or chlorophyll absorbing certain of the rays of light whose energy is used to build up simple carbohydrates like starch and sugar, or perhaps primarily proteins. The flowers are variously arranged, they may be solitary or in pairs in the leaf axils, in racemes or spikes, in heads or in branched panicles.

The floral structure has already been mentioned in a general way. The stamen is generally regarded as being represented in all cases of Australian Orchids by a single fertile anther, borne at the top of the column. The pollen is mostly somewhat waxy and is usually arranged in two to eight small globose, egg-shaped or club-shaped pollinia or pollen masses, which are either free or attached by a strap-like body called the caudicle to an adhesive gland or disc on the rostellum. The stamens are one or two, just below the anther. The upper border is usually though not always, developed into a small body called the rostellum, a hinged or easily detachable organ supposed to represent a sterile or abortive stigma. The column is variously shaped, lobed or winged, it may or may not be developed into a foot at the base, and has an important place in Orchid classification. The ovary is inferior, that is below the perianth segments and stamens, which are situated above it. The ovary eventually develops into a seed capsule, the seeds themselves being minute and borne in great abundance.

Various schemes of classification of Orchids have been proposed. In Bailey's "Queensland Flora," the only

complete account of Queensland Orchids we have up to date, the system followed is that of Bentham and Hooker's "Genera Plantarum," a system followed by many botanists. In this the Orchids are divided up into a number of tribes and subtribes. Most amateurs who have attempted to determine their plants by this system have found it very difficult of usage, particularly as to the placing of their Orchids in the correct tribe, and the following abbreviated and simplified definitions of the four tribes are given herewith.

Tribe 1.—Epidendreae.—Epiphytic or terrestrial; pollinia waxy, 2 to 8 without caudicles.

Important genera are Oberonia, Liparis, Dendrobium, Bulbophyllum, Eria, Spathoglottis, Phaius and Calanthe.

Tribe 2.—Vandeae.—Epiphytic or terrestrial; pollinia 2 to 4 with caudicles.

Important genera are Eulophia, Cymbidium, Geodorum, Dipodium, Sarcochilus, Cleisostoma and Ornithochilus.

Tribe 3.—Neotticae.—Terrestrial, often tuber-bearing; pollinia mealy, with one or two caudicles, with one gland or disc. This tribe includes most of the smaller terrestrial Orchids native to the open forest, sandy lands and peat swamps.

Important genera are Spiranthes, Thelymitra, Diuris, Cryptostylis, Prasophyllum, Mierotis, Corysanthes, Pterostylis, Caleana, Drakaea, Acianthus, Eriochilus, Cyrtostylis, Caladenia, Glossodia, Calochilus, Chiloglottis, Pogonia, Gastrodia and Epipogon.

Tribe 4.—Ophrydeae.—Terrestrial; pollen masses mealy, 2 caudicles and 2 discs.

The only genus is *Habenaria*.

In the "Queensland Flora" a fifth tribe is included, the *Cypripediceae*. This tribe includes the well known *Cypripediums* and is represented in Australia by one genus, *Apostasia* found in North Queensland. It has, however, several features distinct from other Orchids, and by most botanists is now included in a separate family, the *Apostasiaceae*.

A question often asked me is how do you find out the name of a plant? In the absence of complete material, that is, say with just a leafy shoot, it is very difficult and unless one knows the plant at sight one can only go upon general appearance as to the plant's affinities, and then compare the specimens with plants of that genus and its relatives in the large garden collection or in the herbarium,

which is a collection of dried plants. In the Queensland Herbarium of the Department of Agriculture and Stock an endeavour is made to have represented at least one dried specimen of every plant growing in Australia. In addition to that, of course, there are great numbers of foreign plants from abroad. In the case of Queensland plants, especially those likely to be of some economic importance, ten, twenty, or even more specimens may be kept to show the plant's range within the State and the variations it exhibits at different stages of growth and in different localities.

If the material is more complete or at least bears leaves and flowers, the usual method when working the plant out if one is unfamiliar with it is to use a key. The key can either be what is known as a natural one or an artificial one. An example of a natural one is that in Bailey's account of the Orchids in his "Queensland Flora," but it has the disadvantage very often of being very difficult to use; therefore in most cases resource is made to an artificial one. The disadvantage of an artificial key is that one may get two species in the one genus very widely separated in it, genera that are closely allied, widely separated, and genera that are in no way related close to one another. This, however, is no great disadvantage as the key can be followed by the arrangement of the genera and species in a natural one, or at any rate what we consider a natural one. To give an illustration of an artificial key, this morning I spent about an hour in making up the following commencement of a key to Queensland Orchid genera.

1. Plants terrestrial 2
 Plants epiphytic (i.e., growing on trees or rocks.
 not in soil)
2. Plants leafless 3
 Plants with Leaves 8
3. Plants tall climbing Galeola
 Plants not climbing 4
4. Inflorescence nodding Epipogon
 Inflorescence Upright 5
5. Sepals and petals united in a
 cup or tube Gastrodia
 Sepals and petals free from each other, not
 united 6
6. Flowers reversed (small—under
 $\frac{1}{2}$ inch across) Prasophyllum
 Flowers not reversed, comparatively large ($\frac{1}{2}$
 inch or more across) 7

- | | |
|--|------------|
| 7. Labellum spurred | Dipodium |
| Labelleum not spurred | Eulophia |
| 8. Sepals and petals all alike | Thelymitra |
| Lowermost petal modified into a distinct
labellum | 9 |

I have come before you to-night in a spirit of diffidence as the knowledge of Orchids has increased so very much of recent years and such a vast number of species have been described that the family has become almost entirely the study of specialists. For my part, when I receive Orchids that are new and present any great difficulties as to classification, I nearly always send them to specialists in Australia such as Dr. Rogers, of Adelaide, and Mr. Rupp, of Woy Woy, N.S.W.; or I might send them to England to the Royal Botanic Gardens, Kew, to the Orchid specialists there, Mr. V. S. Summerhayes.

To illustrate this I may say that recently I received from Mr. B. D. Grimes specimens of a *Dendrobium* from Northern Queensland which did not agree with any Queensland species previously recorded, but seemed to come nearest to one from New Caledonia. A description was drawn up and sent to the Royal Botanic Gardens, Kew, with the note that if it was new to science and distinct from the Melanesian *D. crispatum*, a description should be published under the name of *D. Grimesii* by Mr. Summerhayes and myself, and this was done in a recent number of the Kew "Bulletin."

NOTES ON TWO CLOSELY ALLIED DENDROBS.

By the Rev. H. M. R. Rupp, Woy Woy, N.S.W.

Dendrobium delicatum Bailey, South Queensland.

D. Kestevenii Rupp, near Port Stephens, N.S.W.

In the proceedings of the Linnean Society of N.S.W., lvi., Part 3, 1931, I described a *Dendrob* sent by Dr. H. Leighton Kesteven, of Bulladelah, N.S.W., as a new species. Subsequently the view was expressed that *D. Kestevenii* was identical with F. M. Bailey's South Queensland species *D. delicatum*. In the same journal, lviii., parts 3-4, 1933, I discussed the question without being able to reach any definite conclusion, owing to the uncertain identity of several forms received under the name *D. delicatum*. Further examination of plants and racemes during 1933-4 has led me to form the opinion expressed in the present paper. Undoubtedly the two plants are very closely allied, but I do not think *D. Kestevenii* can be regarded as a form of *D. delicatum*.

The type locality of *D. delicatum*, according to Bailey (Q.Fl. v. p. 1527), is "Main Range, near Too-

woomba," about 100 miles W. of Brisbane. Mr. F. A. Weinthal collected plants in this locality some years ago, but after a more recent visit reported that he was unable to find any. One of Mr. Weinthal's plants has now been in my possession for 4 years, and in 1933-4 it flowered freely. I have no doubt that it represents Bailey's type. It seems certain that white-flowering forms of *D. Kingianum* Bidw. have often been mistaken for *D. delicatum*, and an article appeared in the English "Orchid Review" a few years ago, demonstrating that a form accepted in England as *D. delicatum* must be placed in *D. Kingianum*. The arguments were unimpeachable; but the form dealt with was not the plant collected by Mr. Weinthal in Bailey's locality, and was not, in my opinion, Bailey's *D. delicatum* at all. It should be remembered that originally (Proc. Roy. Soc. Q'land, i.) Bailey described his plant as *D. speciosum*, var. *delicatum*, subsequently raising it to specific rank. Is it likely that a botanist of his distinction, familiar as he was with *D. speciosum* and *D. Kingianum*, could mistake a form of the latter for a variant of the former? The point is surely hardly open to argument. It was probably the rarity of *D. delicatum* which led to the supposition that a certain white-flowering form of *D. Kingianum* must be Bailey's new species. Whether the genuine *D. delicatum* has been found elsewhere than in the type locality may perhaps be open to question. A specimen from Mrs. H. Curtis at Tamborine Mountain seems to agree with Mr. Weinthal's Toowoomba plant, but in all other cases specimens actually received by me as *D. delicatum* seem beyond doubt to be *D. Kingianum*.

D. Kestevenii was discovered on the rocks of the Alum Mountain at Bullahdelah, not far from Port Stephens, N.S.W. It has not been seen elsewhere, though exhaustive search has been made by collectors in many "likely" areas. The distance from Bullahdelah to Toowoomba, in a direct line, is approximately 350 miles. The Alum Mountain has an elevation of less than 1,000 feet, and is within 12 miles of the ocean. The Toowoomba highlands are 100 miles from the ocean, and reach 3,000 feet. Thus the conditions of the two plants are very different, and there is a gap of 350 miles between them—a gap reduced very slightly even if the Tamborine specimen referred to, be *D. delicatum*. During a recent trip to the Bellinger River and the Dorrigo highlands, about half-way between Bullahdelah and Toowoomba, I failed to find any *Dendrobium* closely resembling either *D. delicatum* or *D. Kestevenii*.

I have tabulated below what seem to be the main distinctions between the two plants. In both cases there is what we might term circumstantial evidence of an origin



Dendrobium Kestevenii Rupp.
Two racemes about half natural size, showing
erect habit.



Dendrobium delicatum Bailey, with a white
flowering form of *D. Kingianum* Bidw.
Note the drooping habit of the racemes
in *D. delicatum*.

due to natural hybridization between *D. speciosum* and *D. Kingianum*; and these putative parents being present in both localities, hybridization may easily have occurred independently with slightly different results. It may be urged that I have used the different conditions at Too-woomba and Bullahdelah as an argument against identity, while admitting that no such argument applies to *D. speciosum* and *D. Kingianum*. This is true; but whereas the two latter species occur over the whole area between the two localities, neither *D. delicatum* nor *D. Kestevenii* has been seen there. Under the circumstances, and in view of the differences set out below, I think we are justified in keeping the two species separate.

D. delicatum.

Stems pale, fairly numerous, slender except for the lowest third, fluted.

Dimensions of longest stem measured: Length, 36 cm. Diameter near base, $2\frac{1}{2}$ cm., half-way, 11 mm., near top, 10 mm.

Leaves longer and relatively narrower (longest measured, $19\frac{1}{2} \times 3\frac{1}{2}$ cm), hardly recurved, dull.

Axis of raceme rather dark green, weak and drooping with weight of flowers, the longest one seen 24 cm.

First flower of plant in cultivation 1934, opened Sept. 13.

Buds deeply suffused with purplish-red, the colour becoming lighter as the flowers mature, but not disappearing.

Number of flowers observed on racemes 7 to 14.

Flowers slightly smaller, segments broader but more acute.

Disc of labellum with 3 longitudinal plates united for almost their whole

D. Kestevenii.

Stems darker green, very numerous and crowded, robust but narrowing near the top, fluted.

Corresponding dimensions: $23\frac{1}{2}$ cm., $2\frac{1}{2}$ cm., 20mm., 10 mm.

Longest leaf measured, 17 x 4 cm. Leaves recurved, moderately glossy.

Axis of raceme very pale, strong and erect, the longest 30 cm. (This measurement is not uncommon.)

First flower under exactly similar conditions, 1934, opened Aug. 28.

Buds often delicately tinted pink, the colour disappearing as the flowers mature, except sometimes on the petals.

Number of flowers 6 to 23. Disc of labellum with 3 similar plates which gradually sink to the level of the labellum and fuse along the mid-lobe.

Mid-lobe very concave

length to the point of lobation of the labellum. There the 2 outer ones end in abruptly outcurved points, the median one dropping suddenly to the level of the labellum and continued along the mid-lobe.

Mid-lobe of labellum very broad, only slightly concave above, its margins *very minutely serrulate*.

Stigma oval.

above, margins not serrulate.

Stigma narrowing upwards.

NATURE NOTES FROM THE CENTRAL DAWSON RIVER.

(By Mrs. Mary House, Theodore, Central Queensland)

Near sunset, on August 1st, I saw three little black and white hooded robins, one in a yellowwood tree, the other two playing about the grass. The male robins of this species (*Melanodryas cucullata*) are clearly white and black, the white being under the base tail, two wing patches and on the abdomen. The female plumage is more of a brownish-grey. They live on insects.

On August 2nd, in the early morning, three snowy sulphur-crested cockatoos performed their toilets on the central snag of our swimming hole; they had an excellent mirror beneath them. A few wood duck (named geese) had retired to the shadows under the dark she-oaks that surround three sides of the pool, and were quietly resting. Across the smooth stone landing-place on the eastern side, big boulders overhang an expanse of reddish water. Here, hundreds of fairy martins were coming constantly in and out, resembling a swarm of bees. The graceful, undulating flight of these tiny avians shows them one moment high in the air; at the next skimming along the surface of the water, taking an occasional wing-dip. Some performed ablutions on the pool's edge, along with the plover-like little sand-pipers (red-kneed dotterels) that ran glidingly about, now wading in the shallows, now rising with clear pretty whirring notes—between a "whirr" and a "rattle!" One can see the martin's bottle-shaped nests, dozens of them, and there are more in the caves beyond. Last season's floods overwhelmed all built here.

Above me, in a high dead tree, two herons are perched, The one uppermost has dark long legs, a dark spoon-bill, elongated crest feathers, and is white save for a black

strip down the neck. The long crest feathers are a "courtship decoration." This is the royal spoon-bill (*Platalea regia*). I have also seen one or two yellow spoon-bills this month (*P. flavifus*). The other bird on a lower limb was a white egret (*egretta alba*); it was pure white, with dark legs, and a longer neck, and a pointed yellow bill. As I gazed, both herons flew away to the uppermost waterhole, where they perched on different limbs of a snag near the side of it. A lower limb was already occupied by a pelican, who has been fishing in these waters for a day or two. He went to seek fresh grounds in about a quarter of an hour, but the other two stayed—to my surprise. One flew on to the same limb as the other, and after a few minutes, both flew down and waded close together until I left the scene. There seems to be a free-masonry between different species of these wading birds. Every morning, on the hole just below our garden, last month (September) *Egretta alba* (of the same species, but I know not if it were the same bird as the white egret already mentioned) fished in company with a tall white-necked heron (*Notophoxyx pacifica*). This one has black markings on his neck-front, beautiful shiny greenish blue-grey plumage, sometimes even a reddish tinge appears, and when it flies two white spots are visible, one on each wing. Sometimes these two were joined by a slender young white-fronted heron (*N. novae hollandiae*) often called a "blue crane," this bird has a white face and throat, grey upper plumage, and its grey under-plumage is tinged rufous.

On a tall tree over Bell Lagoon, some miles distant, I caught sight of what I believe to have been a Nanken night-heron recently. This is a nocturnal species; it has a black crown and nape, with long white plumes from the latter, the upper is rich chestnut, the neck and chest a reddish-chestnut, and it has a white abdomen. It was dusk, and my glasses showed it more as a puce in the coloured parts, but from the general shape and appearance, I believe it was the night-heron. Two little dab-chicks played, and dived about the lagoon weeds. Pallid cuckoos are to be heard about, and rarely one sees them in leafy trees quite close, so that I am wondering which bird's nest they have designs upon.

Some miles away in forest country lately, an owl was seen eating a scrub-turkey in a high tree fork. The owl was the smaller bird of the two—of course, it may have killed the turkey at night, and the latter may have fallen into the tree fork. Bushmen say that they some

times find owls eating kookaburras, which must be killed when sleepy at night time. Trillers and peaceful and bar-shouldered doves are mating now; jabirus have been seen on cotton patches near Theodore canals, and one day recently a fine large one visited our billabong close to the garden. Babblers are bringing out young ones; pale-headed parrots are here in numbers, and many red-winged ones. On a station, where there are few watering places, about 18 miles or so from the river, I am told that there are hundreds of rainbow lorikeets as well, which make a gorgeous display when they come to water at the troughing near the big tanks about sunset.

Towards the end of September, visiting Rockhampton, I paused to admire a tall spreading *Schotia* tree which throws a cool grateful shade near the Girls' Central State School, on the William Street side. There are two of these trees near the school; they possess pinnate leaves consisting of five pairs of lanceolate leaflets. The young leaves are of a beautiful tender green, the older ones of a darker shade, and the red flower-clusters are extremely handsome. The flowers have deep blood-red petals and ten tall stamens, all springing from a united cup-like base, and in the centre the pistil. Before they open, the flowers look like red pods. In the branches, feeding on honey from these showy-fragrant blossoms were hundreds of rainbow lorikeets (Blue Mountain parrots) as tame, noisy and fearless as possible, and considerable numbers of red-winged parrots (crimson-winged lorries), and green leeks (green, with yellow and a little red). Here was an excellent field for nature study in the heart of a city. There are many *Schotia* trees growing in the streets of this well-laid out-town of the Fitzroy River, and everyone I saw of any size was full of feasting parrots.

THE PRODUCTION OF PROTEIN FROM INORGANIC MATERIAL.

Mr. W. D. Francis, Assistant Government Botanist, Brisbane, assiduously continues his researches on the above important subject. His latest contribution is "The Mechanism of the Production of Protein from Inorganic Material by Iron: The Relationship of the Iron Bacterium *Leptothrix* to Nuclear Chromosomes," and consists of 16 pages of printed matter and two plates. It is published privately by the author. Attention is drawn to the similarity in the shape and structure of the chromosomes in a fern and one of the higher flowering plants, obviously two plants very widely separated from each other in the scale of vegetation. This prompts the statements that

"the fundamental structure of chromosomes is evidently similar in all organisms in which they occur"; and again, after discussing the relationship between the iron bacterium *Leptothrix* and nuclear chromosomes, that "the very striking similarity in the structure and component material of the iron bacterium *Leptothrix* and chromosomes is scarcely likely to be accidental. Already it foreshadows the conclusion that structure is closely linked with the material composition and that both these conditions are together linked with function." Chapter 10 deals with carbon dioxide assimilation green plants, and here the author correlates some of his experiments with those of Saposchnikow, published in 1894, in which that botanist came to the conclusion that protein is the primary product of assimilation in green leaves, and that carbohydrates are only the cleavage product of this protein.

Mr. Francis is to be complimented on his original outlook and his fearlessness in publishing the results of his investigations. It is work which no serious student of the fundamentals of biology can afford to ignore.

C.T.W.

BOOK REVIEWS

AN INTERMEDIATE BOTANY.

By A. B. Cayley.

The latest addition to the Shakespeare Head series of Australian Nature Books is "An Intermediate Botany," by A. B. Cayley, B.Sc.Agr., Sydney, M.Sc. Wisconsin. The book is well written and the author's style is simple and lucid. For agriculturalists and nature students this little work should be of great value for it sets forth most of the fundamentals of botany in a very simple and easily understood fashion. However, a number of inaccuracies were noted and it is hoped that these will be corrected in any future editions. The chapter on stems might have been improved by a description of the structure of a typical monocotyledonous stem. A very useful feature is the incorporation of chapters on weeds, pasture improvement and plant environment. These represent a welcome variation from the usual elementary botany book. Another feature of note is the manner in which practical application of the various principles under discussion are given.

Taking it as a whole, the volume is an excellent elementary text-book for the use of Australian students. It is published by the Shakespeare Head Press Ltd., Sydney, and the retail price is 3/9.

S.S.L.E.

"The Bird Wonders of Australia," by A. H. Chisholm, 300pp., and numerous Photographic Plates, published by Messrs. Angus and Robertson, Sydney. Price, 6/-.

Messrs. Angus and Robertson are to be congratulated on the number of books they have recently published dealing with Australian wild life. Among the latest is the above, by one of our leading ornithologists, best known to general readers by his several popular works on Australian bird life. The present book is one that has been written "to order" on behalf of the publishers, and this frequently means "commonplaceness"; but here is the exception that proves the rule, and in the reviewer's opinion the present is one of the most fascinating books the author has written.

Mr. Chisholm has travelled wide and far in the Commonwealth in pursuit of his studies, and the positions he has held on big metropolitan papers in three capital cities has brought him in touch with numerous correspondents, a combination which has permitted him to give us this "purifying breeze from the bush." Over 100 photographic illustrations add to the interest of the book and it can be recommended alike to serious students of ornithology and that ever-increasing number of the public who take a general interest in Australian wild life and its preservation.

C.T.W.

MORTON, NOT MOR(E)TON BAY.

Discussing the history of Moreton Bay in an address before the Royal Society of Queensland at its September meeting, Professor F. W. S. Cumbrae Stewart said it had now been shown that beyond doubt that there was nothing in the suggestion that the Spanish were the first along this coast. Captain Cook was the first. He had named the northern extremity Cape Morton (not Moreton), and the bay facing the ocean south of it, "Morton" Bay. The eminences to the north he called "the Glass Houses," and they should not be called anything else. Between Cape "Morton" and the mainland he named the bay, which now we call Moreton, Glass House Bay.

THE QUEENSLAND NATURALIST

JOURNAL OF THE QUEENSLAND NATURALISTS' CLUB
AND NATURE-LOVERS' LEAGUE

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PROCEEDINGS.

Annual Meeting, Monday, 18th February.

1935.—The chair was occupied by the President, Mr. E. W. Bick, and 31 members were present. Mr. J. O'Neill Brenan was elected an honorary member of the club. Eulogistic remarks were made on Mr. Brenan's association with the club, and his general work in popularising the study of natural history in the State. Miss I. Roberts was elected an ordinary member. A general report on the trip to Bishop Island was given by Dr. E. O. Marks. The general Annual Report was read by the Honorary Secretary, Miss E. E. Baird. These were followed on by reports from the Honorary Excursion Secretary, Mr. J. E. Young, Honorary Librarian, Mrs. G. L. Jackson, and Honorary Editor, Mr. C. T. White. The financial statement was read by the Honorary Treasurer, Mr. F. Kunze, and showed a credit balance of £87/17/7. Thanks were extended to the Honorary Lanternist, Mr. W. J. Sanderson. Officers for the year were elected as set forth on the inner page of the front cover. The retiring President, Mr. E. W. Bick, gave an address on "Canberra and Its Trees." Specimens of wild flowers from New Zealand were tabled by Miss D. Miles and Mr. J. Nebe.

EVENING MEETING, MONDAY, 18th MARCH, 1935.—The chair was occupied by the President, Mr. G. H. Barker, and about 56 members were present. Mr. W. Hodgson was elected an ordinary member. Reports on the excursion to Dawson Road were given by Dr. E. O. Marks (geology), and Mr. G. H. Barker (birds). The chief feature of the evening was a lecture by Dr. F. W. Whitehouse on "Arid Lands of the West," which dealt specially with observations made on his last trip into far Western Queensland, towards the Central Australian

border. Mr. H. G. Barnard showed two paintings by his daughter, of Blue Mountain parrots, one of the usual colour, and a freak, showing variations.

EVENING MEETING, APRIL 15th, 1935.—The chair was occupied by the President, Mr. G. H. Barker, and 48 members were present. With the aid of a wonderful series of lantern slides and a moving picture film, Mr. J. Nebe gave a most interesting account of a recent visit by himself to the North Island of New Zealand. Features of geological, botanical, and general natural history interest were touched on.

EVENING MEETING, MAY 29th, 1935.—The chair was occupied by the President, Mr. G. H. Barker, and 37 members were present. A letter was received from the Under Secretary, Department of Agriculture and Stock, in reply to one from the club about the alleged shooting of birds on islands of the Barrier Reef. The reply stated that the islands referred to had now been proclaimed sanctuaries, and it was decided to write to the Department congratulating it on its action. Misses C. Ringrose, I. Smith, and E. Earnshaw, and Dr. W. H. Bryan, were elected ordinary members. Mr. L. G. Dovey was elected a country member. The main business of the meeting was a report on the Easter excursion to Numinbah, Dr. E. O. Marks and Dr. W. H. Bryan, speaking on the geology, and Dr. D. A. Herbert and Mr. C. T. White, on the botany. Mr. F. A. Perkins spoke on the more interesting insects seen, and Mr. G. H. Barker and Mrs. W. Mayo on the birds. A general report on a visit to some spots of interest near the camp was read by Miss H. Clarke. A general report on the excursion to Bald Knob, Blackall Range, was given by Mr. G. L. Jackson, and a list of the birds observed was read by Mr. N. Jack. Exhibits included some land shells from the Numinbah Valley and Blackall Range, collected by Miss Carriek, and commented on by Mr. H. Tryon. Specimens of Mistletoe in seed were sent by Mr. Herbert Curtis from Tambourine Mountain, and were commented on by Mr. C. T. White.

EVENING MEETING, JUNE 17th, 1935.—The chair was occupied by the Vice-President, Dr. D. A. Herbert, and 42 members were present. A brief report on the excursion to Maroochydore was given by Mr. G. L. Jackson, and to Mount Coot-tha by Dr. E. O. Marks. The main business of the meeting was a lecture, illustrated by lantern slides and moving picture film, by Mr. J. Nebe, on a recent trip of his through the South Island of New Zealand.

ANNUAL REPORT OF COUNCIL OF QUEENSLAND NATURALISTS' CLUB FOR THE YEAR ENDING JANUARY 31st, 1935.

The Council of the Queensland Naturalists' Club has pleasure in submitting the 29th Annual Report of the work of the Club.

MEETINGS:—Ten Council Meetings, ten evening meetings, a Wildflower Show, and twelve Field Excursions, have been held during the year.

Attendance at Council Meetings has been as follows:—Mr. Bick 9, Mr. Hardy 7, Mr. Barker 8, Mr. Perkins 6, Miss Baird 10, Mr. Kunze 8, Mr. Young 9, Mrs. Jackson 8, Mr. Jackson 8, Mr. Nebe 7, Mr. Rowley 8, Dr. Marks 8, Mr. Sanderson 5, Mr. White 6.

The attendance at evening meetings has been good, the average being 39. Interesting lectures and papers on many branches of Natural History have been given during the year, many being illustrated with lantern slides. The lecturers included Mr. J. E. Young, Mr. A. Cayzer, Mr. J. B. Howie, Mr. F. A. Perkins, Mr. Hermann, Mr. C. T. White, Miss W. Ponder, Mr. G. H. Barker, and Mr. E. W. Bick.

Reports of Excursions have been given and Exhibits shown by various members.

The Wildflower Show was held on September 1st. The flowers were good, and represented many parts of the State, but the attendance was not equal to that of the past few years.

MEMBERSHIP:—Nine new members have been elected during the year, and ten have resigned. Five unfinancial members have been removed from the list. The membership list now stands at 121.

NATURE LOVERS' LEAGUE:—Very little has been done during the year, and the activities of the league have practically ceased.

"QUEENSLAND NATURALIST":—Three issues of the journal have been published during the year, and exchanges have been well maintained. The Editor again makes a plea for additional material suitable for publication.

BIRD PROTECTION:—Several deputations waited upon the Minister for Agriculture, Hon. F. W. Bulcock, M.L.A., to urge greater protection of birds, and, generally speaking, met with a sympathetic reception. A special plea was put forward for the protection of the bustard. This originated in a circular letter addressed to various local influential persons, supported by Mr. F. L. Berney, the

well-known ornithologist of Western Queensland. After some delay, the Government consented to have this bird put on the totally protected list, a matter that will bring satisfaction to all bird lovers, both in Australia and abroad. It may be mentioned that at the present time there is a general trend towards nature protection in Queensland. Enquiries into reports of bird poisoning by dingo baits were made, and in most cases found to have little or no basis.

PRESERVATING PLACES OF SCIENTIFIC INTEREST:—A notice has been placed on the Bora ring on the Nudgee Reserve. Another notice has been erected at the Leichhardt Street quarry, with the hope that they will help to preserve these interesting features, anthropological and geological respectively, in the city area, and the club has helped financially to have these notices prepared.

EXCURSIONS:—The Honorary Excursion Secretary (Mr. J. E. Young) reported the excursions held during 1934 were fairly well maintained. At the annual Easter camp, at Mt. Edwards, a total of 50 members and their friends were present.

The arrangements for so many, and at the site chosen, necessitated somewhat more work than usual, but all this was successfully accomplished.

The site was at the mouth of Mt. Edwards gorge, which forms a remarkable feature in the shape of a cleft in the trachytic substance of the mountain. (See Dr. E. O. Marks, in "Queensland Naturalist," Vol. 9, No. 3.)

This locality presents a fair variety of country, scrub, rain forest, and open forest, mountain and lowland, to explore.

Mt. Edwards and Greville were both ascended, the latter by a rift or gorge on the south-eastern side, in which palms, tree ferns, and the Queensland Beech (*Gmelina*), were noticeable, the former for their great height.

Different branches of study were followed up, and the preparation of specimens at night, were watched with much interest.

The weather was good and in marked contrast to that experienced nearer to the metropolis.

Other excursions were held during the year, to the following places:—Lone Pine Zoo, Nudgee Waterholes, St. Helena (by motor boat), Beerwah Forest Station (full day), Mt. Mee (week-end), Bribie Island (week-end), One Tree Hill, Holland Park to Rocklea, and Sunnybank to Runcorn, and Sandgate lagoons (half-day, for water-

fowl). In conjunction with the National Parks Association, a visit was paid to "Binna-burra" (a two days trip, unfortunately marred by rainy conditions).

This makes a total of 12 localities visited by official excursions of the club.

LIBRARY.

The Hon. Librarian (Mrs. G. L. Jackson) reported the library continues to be a popular section of the Club, and is fairly well patronised by members.

Country members also continue to be catered for, and parcels of magazines and pamphlets are posted to those who desire them, by the Hon. Secretary.

Quite a number of interesting little text books on various subjects have been handed to the Hon. Editor of the "Queensland Naturalist" (Mr. C. T. White) for review, and have been passed on by him to the library.

Dr. Malaher has kindly contributed two fine books on birds.

Mr. Nebe continues to present monthly copies of the National Geographic Magazines, and Mr. Barker, various copies of "Bird Lore" and other magazines.

On behalf of the Club, the Librarian thanks these members for their very welcome contributions.

Any other donations of suitable books on Natural subjects will be gratefully received by the Club.

E. W. BICK, President,

Miss E. M. BAIRD, Hon. Secretary.

BALANCE SHEETS.

Queensland Naturalists' Club.

RECEIPTS.

	£	s.	d.
To Cash at Banks, December, 1933	82	10	4
„ Members' Subscriptions	49	5	0
„ Tent Hire	3	5	0
„ Surplus from Excursions	6	2	0
„ Commonwealth Bank Interest	1	19	2
„ Wild Flower Show Receipts	24	6	6
	<hr/>		
	£167	8	0

EXPENDITURE.

	£	s.	d.
By Rent for Committee Room (Women's Club)	2	10	0
„ Rent for Lounge (Women's Club)	10	0	0

„ Secretary, Petty Cash	10	0	0
„ Insurance		5	11
„ Printing "Naturalist"	32	6	8
„ "Naturalist" Wrappers	1	3	1
„ Permanent Building Bank Charge .. .	10	0	
„ Purchase Tent and Pegs	13	3	6
„ Sewing Tent	10	6	
„ Binding "Naturalist"	7	6	
„ Specimen Case	12	6	
„ Affiliation the Horticultural Society .. .	10	6	
„ Wild Flower Show Expenses	21	12	0
„ Sending Wild Flowers to Victoria (freight)	10	0	
„ Balance Forwarded (in Banks)	73	5	10
	<hr/>		
	£167	8	0

NATURE LOVERS' LEAGUE.

	£	s.	d.
Forwarded from 1933	13	8	11
Sale Certificates, 1933-4		4	4
(from Mr. Longman)			
Sale Certificates and Freight	1	1	6
	<hr/>		
	£14	14	9
	<hr/>		
	£	s.	d.
Insurance Certificates		3	0
Balance Forwarded to 1935 (in Banks) .. .	14	11	9
	<hr/>		
	£14	14	9

C. W. HOLLAND, Hon. Auditor.
F. KUNZE, Hon. Treasurer.

QUEENSLAND, NERANG VALLEY, EASTER EXCURSION.

Queensland Naturalist Club.
The Wanderers.

By Misses H. Clarke and D. Grimes.

Our little group spent most of the time exploring the surrounding country.

The first day's trip was to try and find the opening to a cave we had heard about, that was supposed to go from one side of Turtle Rock to the other, the other end overlooking Egg Rock.

Turtle Rock is a sharp outcrop sheer at the end, facing Egg Rock, and further back its steep sides, heavily wooded, and with thick scrub caressing its base.

Our climb took us up the saddle between Turtle Rock and its neighbouring mountain. We left the main road at the Stone House, which is a district land mark, having been made by its owner, stone by stone, from rock hewn out of his own land, which was identified as volcanic ash.

We had lunch at the top of the saddle. The weather did not look very inviting when we started, but rain had held off. We coaxed a fire and made tea, but almost as we put our cups to our lips we heard thunder, and before we had time to even drink a mouthful a heavy storm broke over us; so we just sat under our raincoats, drank our tea and ate our lunches, and the melancholy trees went drip! drip! drip!

We were all rather wet as we set off to find our cave entrance, in which undertaking we were not successful. However, along the top of Turtle Rock we found other things, some few wild flowers, *Prostanthera*, *Cryptandra*, *Leucopogon*, and the yellow everlasting *Helichrysum*.

On our way up we had seen numerous white cockatoos, some quarions, rosellas, the red browed finch, coo-ee bird, currawongs, and on the way back, a black cockatoo. The elusive whip-bird was often heard, but not seen. We saw others, but did not know their names.

At the end of Turtle Rock one of the party climbed down to where he could see the entrance to one end of the cave, that which looks out upon Egg Rock, after which we turned homewards. We decided to try the other side of the saddle this time, and experienced, to me at any rate, what was the most delightful few minutes in the whole of the camp time.

We were clambering down the steep sides in the wet grass, and the trees all round us were gleaming and glistening in the fading sunlight, when suddenly we were in the middle of the bell-birds, the first I ever saw or heard, and their tinkling clear voices were all about us, and now and again two would call almost together, with a soft blurred dissonance of sound, which fell exquisitely upon ears more used to city noises.

We were loth to leave this spot, but it began to get dark, and we still had our way to find, so we went on down through the open forest to the scrub, and found the creek at the foot of Egg Rock, which we followed, and so back to camp.

The second day we planned to reach Binna Burra, along through Beechmont, come down through the scrub,

to Egg Roek, and so baek to eamp; but through some wrong direetions, and the day deeciding to become night too soon, our plans went awry.

We eame baek the way we went in a manner not meant. However, we erossed Nerang River, over a plank, up a snigging traek, through the scrub, along a most unpleasant priekly path, and here we heard a eat-bird eall, then through long high grass, whose base was liquid mud, ploughed up by the eattle in making their way through it, thence up to the road on Beeehmont, about a mile before the school. We had a magnifieent view of the surrounding eountry—to the right, Flinders Peaks, Tambourine; to the left, Mt. Warning, and down Numinbah Valley, to Stradbroke Island.

Along the main road, as we neared its end, weeds grew very thickly on eleared portions of the rich red soil, not under eultivation, and in one part. potatoes were growing on the footpath, with a hedge of weeds, some six or seven feet high, behind them. This main road gavé us some miles of pleasant walking, then led us in to the forest again, and was no longer a main road, but just plain road. We went through open forest and grass trees skirted the tops of gorges with the thick scrub growing to the road's edge, and through more open forest, and at last, elimbed Mt. Roberts, up to Binna Burra.

On the way up we had various views of Egg Roek, which became quite dwarfed in size as we viewed it from afar, but never insignifieant. Along the steep side of the mountain, and quite close to the path, we found a good specimen of Hyacinth Orchid (*Dipodium*), which showed the folk staying at Binna Burra respect the National Park regulations in regard to wild flowers.

From Binna Burra we looked out to Cunningham's Gap and Spieer's Gap, down Nixon's Creek gorge, to Egg Roek, saw Springbrook and Robert's Plateau.

We heard some more bell birds, received a lift for a couple of miles in the ears belonging to the Beeehmont boarding house, and eame to the morass in the moonlight. Through this we plunged and slipped, and after about ten minutes or so of messing round in mud over our ankles, found the right path. It was rather eerie wandering round in the dark in that mud, the moonlight being nothing to speak about, seeing flickering pin points of light from the preeious matches, and in the distanee suddenly a dingo howled. However, once on the path, the priekles kept us in the narrow way of virtue, and we just had to keep going

and endeavour to stay upright. We arrived back at the camp, and greatly appreciated the hot food saved for us by some kindly spirits.

On the way down we saw some glow worms on the scrub path. These gave out a pale, whitish light. Unfortunately, no specimen was gathered.

The third day most of the club members went to Natural Bridge, which is a very interesting place from all points of view. The flashing waterfall, which, viewed from above, seems to fall sheer into the bowels of the earth, from below, issues from a dark cavern and flows on in the sunlight.

Here we saw glow worms again, on the ceiling of the cave this time, and they were little pin points of green light. We then followed the creek down a few hundred yards, but found a clearing and turned back and went on upward. The creek branched near a sawmill. Two followed up the left branch nearly to the base of the cliffs of Springbrook, and found the going very stiff and slippery. The remainder followed a snigging track, and then hacked a pathway through bracken, lantana, and raspberry bushes, and explored the ridge leading up to Springbrook, but the catching of a carpet snake occupied our attention for a considerable time, and we had to return direct to the camp instead of tackling the circuitous journey round through Springbrook.

On this trip we saw quite a number of the birds we had seen on the first day's outing, and, of course, others of which we knew nothing.

The fourth day some of the party explored Nixon's Creek gorge. We had heard of a high waterfall further up the creek, but after our Binna Burra experience, we took off some fifty per cent. from the height, so did not expect such a high one after all. This journey had a strict time limit, as it was the last day, and trains wait for no man.

We reached the scrub at the base of Egg Rock and scrambled up the creek. We saw two falls. The scrub was very thick and palm groves were found along the creek. After a time the cliff walls opened considerably. Above the scrub, along the creek, was very open forest country. As the time limit had expired, we had to return, and did not have much time to observe anything very closely. However, we saw two orchids, *Liparis reflexa* and a small *Bulbophyllum*.

NOTES MADE ON EASTER EXCURSION, QUEENSLAND NATURALIST CLUB, 1935.

Geology of the Upper Nerang Valley.

By E. O. Marks, M.D., B.E.

As has been the experience on most of our excursions, the three or four days proved insufficient to attain a clear understanding of the local geological features, though as usual, providing ample material to show the structural problems awaiting solution and contributing something towards that end. There is ample fieldwork at Numinbah to occupy many Easter excursions.

It often happens in geological work that an area which, on slight acquaintance, seems capable of a simple and satisfactory interpretation is found, on closer acquaintance, to be much more complicated than was previously thought. This is the case with the Numinbah region, and the excursion has left us in a greater fog than when we started, except that we are clearer as to what we do not know and what we need to find out.

The geology of the Numinbah or Upper Nerang Valley, is largely a continuation of that investigated on our excursions to Canungra, and reported in the "Queensland Naturalist," of July, 1928. For those not familiar with the essential features it may be well briefly to recount them.

The oldest rocks in this corner of Queensland belong to the extensive series known as the Brisbane Schists. They are a group of very ancient sediments, whose age or ages is not definitely known, though part is probably Lower Carboniferous, as indicated by fossils discovered recently by Mr. L. C. Ball, at Northbrook, in the Brisbane Valley. The sediments have suffered varying degrees of folding and metamorphism. In the area we are dealing with they are of the class known as greywacke, which is an altered and compacted sediment, coarse or fine in grain, consisting of rock debris rather than quartz sand, as is the case with ordinary sandstones and its altered form quartzite.

After these ancient sediments had been folded and subjected to metamorphism, they were exposed to denudation. On an uneven surface, carved out of them by denudation, the extensive fresh water deposits of mesozoic time were laid down. Near Brisbane the Triassic "Ipswich" coal measures, mainly shales and sandstones, were immediately preceded by a varying thickness of trachytic volcanic ash, under which is a little shaley material, with silicified tree trunks, representing probably the old land surface, soil and drift, buried by the volcanic ash. This "Brisbane

Tuff" occurs therefore between the schists on which it is resting and the Ipswich beds above, and is found outcropping along the margin of the schists.

Above, or after, the Ipswich strata, there followed a great thickness of sandstone, known as "Bundamba," which, in turn, was followed by the "Walloon" coal measures of Jurassic age.

Upon and into these sediments, perhaps partly in late mesozoic times, perhaps wholly in the Tertiary period, there were extruded and intruded great thicknesses of volcanic material, both lava flows and fragmentary ejecta, of the dark basaltic as well as the light-coloured trachytic or rhyolitic types. The final effort of the vulcanicity in this region appears to have taken the form of extensive flows of basaltic lava, covering wide areas and forming a lava plain or plateau.

Rain falling on the plateau collected into numerous more or less parallel streams, with a general northerly trend. In the course of time these streams have carved their valleys down through the volcanic material, leaving intervening portions of the plateau still at high elevations. One stream, Back Creek, has not yet cut its way through the basalt, and runs, on Becchmont, at an elevation of 1700ft. for some miles, while its immediate neighbours on either side, the Nerang and Coomera, are in valleys 1200ft. below.

Briefly, the region is characterised by deep valleys separating remnants of a formerly continuous plateau, consisting of a complex of volcanic rocks resting on mesozoic strata, and the still older greywacke, on which the mesozoic strata themselves rest.

The geology so far sounds reasonably clear. Our problem, however, occurs in the relationships of the varying types of igneous rocks to each other in the field, their positions relative to the greywacke, and to the mesozoic strata, and the nature of the surface on which they have been extruded. The evidence of vulcanism on a grand scale in South-east Queensland, has naturally been a subject of intense interest to local geologists, and the subject of much enquiry as to its age and sequence. With a gradually increasing knowledge of the field relationships views have changed from time to time, but we are not yet in a position to be definite.

Formerly some attributed all or most of the volcanic phenomena to the mesozoic period. Latterly, the most accepted view regarded all as Tertiary, and divided the volcanic rocks into a lower and upper basaltic phase, with an intervening trachytic or rhyolitic phase. This was cor-

related to a similar division in the extensive volcanic occurrences in Victoria.

This classification however, does not fit satisfactorily with what we found either at Numinbah or Canungra. The uppermost rock is basaltic, certainly, and in some parts, rhyolitic rocks occur beneath the latest basalt. Less commonly basalts are found below the rhyolitic rocks. The impression gained at Numinbah is rather of a complex of alternating types, than of a three-fold division. For instance, in a traverse up the valley, from near Numinbah to the border, we pass in sequence, from greywacke to rhyolite to basalt, to sandstone, to trachytic tuff, to sandstone, to rhyolite, to basalt, and while on basalt at 1300ft., in the gap at the border, we have on either side, high cliffs of trachytic rocks surmounted by basalt up to 3500ft. and more.

This sequence is not consistent with the three-stage view, and a similar complex was found by Mr. C. C. Morton, at the head of Little Nerang Creek, on the eastern side of Springbrook.

The structural relationships of some of the rhyolite is extremely puzzling. It will be recalled that in the Coomera gorge, near Canungra, which lies between Tamborine Mountain and Beechmont, the rhyolite occurred in a belt, to the east of which the schists rise to elevations up to and over 1500ft., and to the west of the rhyolite belt the sandstone rises to 1000ft., while the bed of the river in the gorge is in rhyolite at only 200 or 300ft. above the sea. All three rocks are capped by the basalt of Tamborine to the north, and of Beechmont to the south, and wherever observed the contact of the rhyolite with the rocks on either side appeared to be very steep, approaching the vertical. To the north of Tamborine Mt. basalt, the rhyolite is again found in a similar position, namely, between the schists and the mesozoic strata in Cedar Creek, and shows itself to the east of the basalt in Guanaba Creek, below St. Bernards.

It was of especial interest to find that in the Numinbah Valley the rhyolite emerges again from beneath the Beechmont basalt capping, still occupying the same position between the schists or greywacke and the sandstone. About a mile to the north of Numinbah we were able to locate the boundary with the greywacke, a very steep contact with the appearance of a faulted junction. A traverse through the timber reserve a little nearer the camp, led us 300 or 400ft. up a hill, with rhyolite all the way, until near the top, where some greywacke outcropped, but the very top was rhyolite, and under it some

water-worn quartz gravel and silicified wood. The gravel and wood show that the junction is not a faulted one, and are definitely against any suggestion that the rhyolite was intruded along a fault line. They suggest rather that the rhyolite flowed onto or against a steeply inclined surface, or one which has since been tilted.

The position of the rhyolite along the boundary of the schists, and the presence of fossil wood beneath it, is strangely similar to the occurrence of the Brisbane Tuff, which has been found as far south as Logan Village, in a bore, only 12 miles from Tamborine Mountain.

An examination of the wood, however, has enabled Mr. W. D. Francis to identify it as being of a comparatively recent type of dicotyledonous tree, whereas the dicotyledonous plants are unknown from Triassic rocks, and the wood under the Brisbane tuff is coniferous.

The correlating of the Numinbah rhyolite with the Brisbane tuff is also negated by the association with the rhyolitic rocks of Springbrook, and the Beechmont National Park plateaus, for this is plainly above some of the sandstone and some basalt. Yet the rhyolite belt occupies the river bed at Numinbah and the Coomera gorge at levels below the sandstone—

At present, this forms a geological dilemma only to be solved by further field work.

A particularly interesting feature was disclosed on our visit to the "Natural Bridge," about two miles from the border gate, and perhaps, half a mile from the road on the eastern side, near the foot of Springbrook.

Here a stream, Cave Creek, falls through a hole in the roof of a cave, some 75ft. across and 150ft. long, converting that part of the roof between the fall and the entrance into the so-called natural bridge.

Set in luxuriant rain forest, with the light streaming down and illuminating the falling water, and the pool into which it falls, against the dark background of the cave beyond, the scene is one of rare beauty.

The rock is basalt, and the cave what is known as a lava tunnel of a type such as are well known, for instance, in the western district of Victoria, and in North Queensland. The origin of such caves is due to the fact that in a flow of molten lava the surface and advancing edge forms crusts owing to cooling. The advancing edge being the coolest part, becomes more viscous than the lava behind it, and forms a steep margin to the flow. At times the pressure behind causes the steeper edge to give way and permit the more fluid lava to drain away, leaving, where conditions are suitable, an empty tunnel in the more com-

solidated material. Though well known phenomena, such tunnels are always of interest to geologists, but it is to be doubted if anywhere such another exists possessing the charm of the triple combination, waterfall, and cave, and tropical jungle.

NATURALIST CLUB EASTER EXCURSION, 1935; NUMINBAH VALLEY.

Bird Notes, by G. H. Barker.

In some respects, our visit to this locality was a disappointment, due chiefly, perhaps, to the fact that the camp, situated as it was, on the border of so many different types of country, much was expected from it in the way of variety of bird life. Our total list for the four days totalled only 60 different kinds, and many of these were records of only one bird of the species. As a matter of fact, the list is almost as interesting from the point of view of what we did not see, rather than from what we did.

Outstanding features of the outing from an ornithological point of view, were the finding of a brush-turkey quite close to the camp, the location of a spine-tailed log-runner's nest, with two eggs, by Mrs. Herbert Curtis, the three rosellas, almost together, in one paddock, a fine flock of white cockatoos, and a number of black cockatoos, and a company of white-backed swallows, on the same wire fence as a like number of welcome swallows. The presence of small flocks of bell birds, and the tameness of butcher birds, both grey and black-throated, who came regularly to the camp mess tables for scraps, and fought over them.

LIST OF BIRDS OBSERVED.

- 8—Brush Turkey (*Alectura Lathamii*).
- 10—Brown Quail (*Synoicus Australis*).
- 29—Brown Pigeon (*Macropygia phasianella*).
- 30—Peaceful Dove (*Geopelia placida*).
- 32—Bar Shouldered Dove (*Geopelia humeralis*).
- 100—Little Pied Cormorant (*Microcarbo melanoleucus*).
- 133—Austn. Spur Winged Plover (*Lobibyx Novae-Hollandiae*).
- 174—Southern Stone Curlew (*Burhinus magnirostris*).
- 179—Austn. White Ibis (*Threskiornis molucca*).
- 180—Straw-Necked Ibis (*Threskiornis spinicollis*).
- 188—White-Faced Heron (*Notophox novae-hollandiae*).
- 189—Pacific Heron (*Notophox Pacifica*).
- 239—Brown Hawk (*Falco berigora*).

- 240—Nankeen Kestrel (*Falco cenchroides*).
254—Rainbow Lorikeet (*Trichoglossus moluccanus*).
256—Scaly-breasted Lorikeet (*Trichoglossus chlorolepidotus*).
269—White Cockatoo (*Kakatoe galerita*).
281—King-Parrot (*Aprosmictus scapularis*).
282—Crimson Rosella (*Platycercus elegans*).
286—Pale-Headed Rosella (*Platycercus adscitus*).
288—Eastern Rosella (*Platycercus eximius*).
322—Kookaburra (*Dacelo gigas*).
324—Forest Kingfisher (*Halcyon Macleayi*).
334—Spine-tailed Swift (*Hirundapus caudacutus*).
357—Welcome Swallow (*Hirundo neoxena*).
358—White-Backed Swallow (*Cheramoeca leucosterna*).
377—Jacky Winter (*Micrococa fascians*).
384—Rose Robin (*Petroica rosea*).
393—Northern Yellow Robin (*Eopsaltria chrysorrhoea*).
398—Golden Whistler (*Pachycephala pectoralis*).
401—Rufous Whistler (*Pachycephala rufiventris*).
408—Grey Shrike-Thrush (*Colluricincla harmonica*).
413—Rufous Shrike-Thrush (*Colluricincla megarrhyncha*).
415—Magpie Lark (*Grallina cyanoleuca*).
434—Southern Chowchilla (nest and eggs) (*Orthonyx Temmincki*).
486—Yellow-Tailed Moinbill (*Acanthiza chrysorrhoea*).
488—White-Browed Scrub-Wren (*Serriocornis frontalis*).
544—Masked Wood Swallow (*Artamus personatus*).
558—White-Throated Tree-Creeper (*Climacteris leucophoea*).
564—Mistletoe Bird (*Dicaeum hirundinaceum*).
568—Red-Tipped Pardalote (*Pardalotus ornatus*).
569—Black-Headed Pardalote (*Pardalotus melanocephalus*).
574—Grey-Breasted Silvereye (*Zosterops lateralis*).
591—Eastern Spinebill (*Acanthorhynchus tenuirostris*).
597—Brown Honeyeater (*Gliciphila indistincta*).
605—Lewin Honeyeater (*Meliphaga Lewini*).
614—Yellow-Faced Honeyeater (*Meliphaga chrysops*).
633—Bell Miner (*Manorina melanophrys*).
634—Noisy Miner (Soldier Bird) (*Myzantha melanocephala*).
647—Australian Pipit (*Anthus Australis*).
662—Red Browed Finch (*Aegintha temporalis*).
690—Australian Raven (*Corvus coronoides*).
694—Red Currawong (*Strepera graculina*).
700—Red Butcher Bird (*Cracticus nigogularis*).
702—Grey Butcher Bird (*Cracticus torquatus*).
705—Black-Backed Magpie (*Gymnorhinna tibicen*).

**"GLOW-WORMS" AND OTHER INSECTS
COLLECTED AT NUMINBAH, NERANG VALLEY,
EASTER CAMP, QUEENSLAND NATURALISTS'
CLUB, 1935.**

F. A. Perkins, B.Sc.Agr.

Generally speaking, the insects were not plentiful, but a number of very interesting species were collected. Sweeping the bracken and grass along the side of the creek in the forest was the best collecting, and a nice series of *Taeniochorista pallida* E.P. (Order Mecoptera), a species which is found rarely in the neighbourhood of Brisbane during the autumn, was obtained. In the same place a long series of an undescribed species of *Tephritis* was collected by sweeping the flower heads of *Centratherum muticum*. Other well known species collected in this way included *Cicadella albida* (Fam. Cicadellidae), *Laphria tectamus* (Fam. Asilidae), *Hasta hastata* (Fam. Ditecyophoridae), *Aprioda balyi* (Fam. Chrysomelidae).

In the creek bed *Plautia affinis* (Fam. Pentatomidae), was exceedingly common on certain water weeds, and a number of specimens of that very handsome damselfly *Synlestes weyersi* were also caught. No Stone-flies and Sialidae, and very few May-flies and Caddis-flies were seen. Common Dragon-flies like *Orthetrum caledonicum* and *Diplacodes haematodes* were very numerous, but the rare *Diphlebia lestoides* which was collected at Mt. Edwards the previous year, was not even seen.

Another very rare insect collected was an undescribed species of Achilidae. This species, of which very few specimens are known, is easily the most handsome of a very beautiful family.

On the way to the border some exceedingly large colonies of a Vespidae wasp were seen on the face of a steep cliff overlooking the creek. After a great deal of trouble several specimens were obtained, and the species identified as *Rhopalidia gregaria*.

Undoubtedly the most interesting insects found on the trip were the "glow-worms", which were so common in the cave beneath the Natural Bridge in Cave Creek. Thousands of these insects were found in the darker parts of the cave, and until they were disturbed, provided a striking spectacle. They proved to be the larvae of a Mycetophilid fly, similar to those found in the famous "glow-worm" caves of Bundanoon in N.S.W., and Waitomo in N.Z. They have not previously been recorded from Queensland.

They were found associated with slimy threads attached to the roof of the cave, more particularly in the darker parts, but also near the mouth where it was relatively light. When they were disturbed they made their way along the threads into crevices in the rock from which it was very difficult to remove them. The exact function of these threads is not exactly known. The glow is produced by a definite photogenic organ situated at the end of the abdomen. It is said to be produced by the oxidation of a compound known as luciferin in the presence of an enzyme-like substance, luciferase. This takes place in a special group of cells beneath the integument known as the photogen layer which is richly supplied with tracheae, which provide a plentiful supply of oxygen. Beneath the photogen layer is a reflector layer, which contains a number of cells with a whitish appearance due to the presence of numerous urate and other crystals.

A pair of adults of the "glow-worm" were taken on the wall of the cave, which, on examination, proved to be practically identical with *Bolitophila luminosa* Sk., the species found in N.Z. and N.S.W. What a remarkable distribution has this species! It must be pointed out that these "glow-worms" must not be confused with the "glow-worms" so common in the Queensland rain forests. The latter are the larvae and wingless females of a number of beetles belonging to the family Lampyridae, of which the winged adults are known as "Fire-flies."

QUEENSLAND NATURALISTS' CLUB EXCURSION, 4-6 MAY, 1935.

By N. Jack.

BIRDS AT BALD KNOB, BLACKALL RANGE.

In compiling a list of birds seen and heard during the Labour Day week-end excursion, spent at Bald Knob, I am bound to admit that my list is not a very imposing one, due to the fact that the short time at our disposal did not permit of me to make an exhaustive analysis of the bird life of that district. Unfortunately, I could not find an opportunity to explore the abundant rain forest found there, so in consequence, my list is lacking in those species that are almost certain to be found in that particular type of country.

The presence of one bird in my list, in my opinion, calls for comment. I am referring to the Bell Bird, or more properly, Bell Miner (*Manorina melanophrys*).

This species is by no means plentiful within the vicinity of Brisbane, as a matter of fact, I only know of one other place of its occurrence, and that is at Spicer's Gap, where the performance of a colony of Bell Birds was successfully broadcasted some time ago. The particular colony of Bell Birds under discussion, was located on the Conondale Range, about $7\frac{1}{2}$ miles from Maleny. I wonder would this be the nearest place to Brisbane in which this species has been found? On information received from our guide, to whom they are apparently old friends, it seems that this colony has lived in that particular locality for quite a number of years. This is in accord with what has already been written about that celebrated bird. It seems that the Bell Miner, when he finds a suitable position, just simply stays put, and rears his family, and so the process continues until they are molested or civilisation drives them back. Other than the family we had under observation, there seemed to be plenty more about, a Bell Bird census of that particular district, if such were possible, would, no doubt, prove interesting.

The Bell Bird, in popular opinion, is certainly the most celebrated of the Honeyeaters. The family to which he belongs, the Meliphgidae or Honeyeaters, is, without doubt, an outstanding one in Australian ornithology, when we come to consider some other members of that group, for instance, that brilliant little gem, the Scarlet Honeyeater, or Blood Bird, with his equally brilliant note, the sombre coloured Brown Honeyeater, with his joyous shout, what a voice he has! The hovering Spinebill, the aerobatic White Nape, the obstreperous Friar Bird, the ringing notes of the Lewin, in the depths of the forest, the sheer beauty of the Regent, and the Yellow Tuft, and many others, what an imposing array! The Bell Miner has achieved fame, not on his appearance, nor on being the possessor of a charming song, but on his ability to raise his voice in chorus, so that the deep gullies and mountain ridges, in which he resides, echo to the sound of a medley of chiming bells. It would seem that the Bell Miners' ability to make the welkin ring, to use a familiar expression, might in this case, be taken in its literal sense.

The Bell Birds of Conondale are not in the least bit shy. They capered among the branches of some nearby trees, just alongside the road, in true Honeyeater fashion. Occasionally one would dive down into the lantana below, so that at times, field glasses became quite unnecessary. The call showed little variation, but to a sensitive ear, the note, at times seemed to vary in pitch, so that the performance could not be called monotonous. Now and then,

one would give vent to a squawk, which would suggest that he had come upon a family of this bird's poor relations, the Noisy Miner, or "Mickey," as we know him. Like "Mickey," they are gregarious, one could not imagine a Bell Bird concert given as a solo, whether they share any of the Noisy Miner's mischievous habits, however, I am not in a position to say, just at present.

I much regret that I can do little more than report the existence of this particular colony for the benefit of those interested. I hope on some future occasion, to visit these birds again, and make a further study of their domestic affairs. Meanwhile, I can only support what has already been said about this remarkable bird, and hope that the ring of the Bell Bird will long continue to enhance the natural beauty of the Conondale Range.

The following are a list of birds noted during our excursions, around Bald Knob and surrounding districts.

Welcome Swallow.

Tree Martin.

Fairy Martin.

Grey Fantail.

Willie Wagtail.

Restless Flycatcher.

Golden Whistler.

Yellow Robin.

Black Faced Cuckoo Shrike.

Whip Bird.

Fantail Warbler.

Brown Thornbill.

Buff Tailed Thornbill.

Variegated Wren.

Red Backed Wren.

Dusky Wood Swallow.

Pewee.

Gray Thrush.

White Throated Tree Creeper.

Silvereye.

Mistletoe Bird.

Black Headed Pardalote

Blood Bird.

Yellow Faced Honeyeater.

Lewin Honeyeater.

Noisy Miner.

Bell Miner.

Pipit.

Red Browed Finch.

Black Throated Butcher Bird.

Magpie.

Currawong.
Raven.
Spurwing Plover.
Stone Plover (Curlew).
Straw Necked Ibis.
White Faced Heron.
Little Pied Cormorant.
Nankeen Kestrel.
Scaly Breasted Lorikeet.
Crimson Rosella.
Kookaburra.
Rainbow Bird.
Fantail Cuckoo.
Pheasant Coucal.

THE BLACK-BREASTED PLOVER.

(*GONIFER TRICOLOR.*)

(By Mrs. Mary House. Theodore, Central Queensland.)

Amongst the many interesting species of birds to be found frequenting our Central Dawson country, one of the most interesting and numerous is the banded, or as we call it, the black-breasted plover. As these birds meet in great numbers on the sand flats, and between the billabong backwaters about our home each season, I recently determined to make a few observations as to the length of time the eggs take to incubate, etc.

The banded plover (*Zonifer tricolor*) is an attractive bird, neither so big nor so fierce as his cousin, the spur-wing (*Lobibyx Novae-hollandiae*) minus the spur, and the yellow wattle face decorations, and his shrill cries are not so pugnacious, and not nearly so harsh.

Spur-wing plovers sometimes nest hereabouts, but we never see so much of them, with their snowy breasts and long red legs, on the sand flats. Our banded plover is brown, with a white abdomen, throat, shirtfront, and line through the eye, a handsome black band across his chest, like a dress waistcoat of the old style, black wing quills, a blood-red spot on either side of the bill, and rufous-brown legs. When flying, an effective white horizontal line is visible, extending from the centre back to the outer centre-wing. The first plover's nest I located easily. The bird was evidently disturbed whilst laying by a flock of goats passing on either side of it, it flew up, and uttered shrill cries, swooping about to scarce the goats from its vicinity. Its nest was merely a depression amongst the grass, and the one egg already laid, was more light green than fawn coloured, as the one discovered last

season had been; although it had the same irregular blackish-brown spots, flecks, and splotches, more at the rounded end than the pointed one. This was perhaps, part of Nature's scheme of camouflage. Last season there was less grass visible, the nests themselves, however, are so wonderfully camouflaged that one may know the exact position of a nest, and yet almost walk over, without visualising it. It is a well-known fact that the Southern stone curlew varies the colour of its eggs to suit the surroundings; as every egg of the twelve found in my three plovers' nests this year seemed to be more green-tinged than those of last year. I think the banded plover shares this peculiarity.

About July 9th, all four eggs were laid in nest No. 1 which was on a sand ridge, about 30 yards from a clump of bauhinia trees. Later on, a second nest was discovered, 600 yards from the first, about 30 yards from a Bottle Tree; and the third nest was 30 yards from a Supple Jack, between two billabong backwaters. Nests are seldom close to any conspicuous object, such as a tree. Each of these nests had the full complement of 4 eggs, when found. I visited all three nests both during the day time, and after dark, but it was not until I had become doubtful as to whether the birds had not deserted their eggs, that one plover was surprised by a horseman, on its nest; after dark. The next day, July 29th, I heard chicks squeaking in the eggs in all three nests, but not one shell was tapped. On August 1st, I carried binoculars, and on observing nest No. 1 I saw three active, tiny, turkey-like baby plovers, running away from it. The wary mother had already departed. Looking about, I found the little ones, motionless, even the little dark stick-like beaks, pressed to the ground. Two were light yellowish fawn coloured, with blackish brown spots and flecks; the third one was a little duller in shade; all had black half circles above white ones round their necks, and light cheeks and underdown. One vocal egg was still in the nest. The parents swooped at me, and circled about, vociferating shrilly, until I left for nest No. 2, where only one egg was chipped. Both birds were visible here, evidently much disturbed by my advent. One trailed a wing as if wounded, the other stood flapping both, as if unable to fly, and both did their best to draw me on in the direction away from the nest.

Two young nestlings and two vocal eggs remained in nest No. 3, between the billabong backwater gullies. Although just hatched, the two little ones hugged Mother Earth. I had come up very quietly.

By August 2nd, the parents had taken all four chicks to cover from nest No. 1, not even a bit of egg shell re-

mained to mark its position; in fact, the birds remove the egg shells as soon as the chicks hatch. The shell comes away from the white membrane, leaving too visible a signal to crows. During the breeding season, plovers wage continual aerial warfare with crows and various kinds of hawks. On August 3rd, the young plovers were removed from nest No. 2. The last remaining egg in No. 3 was hatching, and I drove away a number of mischievous grey and brown apostle birds (*Struthidea cinerea*), which had managed to hunt the parents from the nest. I received no thanks at all, but retired in good order. I had seen eleven chicks in the three nests, and as next day, the third nest was empty, I think I am right in concluding these birds hatched and took to cover, 100 per cent. Many other birds nested just then, and plovers are still about the ridges.

**NOTES ON THE SEDGES (FAMILY CYPERACEAE)
FOUND IN THE BOTTLE CREEK SECTION OF THE
BAFFLE CREEK CATCHMENT AREA.
PORT CURTIS DISTRICT.**

By L. G. Dovey (Rosedale).

Cyperus polystachyus: Common, often found growing in moist sand shortly after floods have receded, and on soils derived from andesitic trachyte on timbered sides.

Cyperus gracilis: Very common about dwellings and sheds generally on the shady side, near tank-stands, etc. Not too common in the open forest. It prefers a soil containing lime.

Cyperus distans: Generally found on hills in partly cleared forest; demands a rather sandy loam. It is fairly common on trachyte hills, and a few plants are seen on soil derived from amphibolite.

Cyperus trinervis: Very common during moist summers on sandy flats near creeks, also in gullies where the soil is of a gravelly nature derived from hardened slate.

Cyperus Haspan: This is often found in patches several yards square in low depressions and on moist sand-banks; prefers some shelter.

Cyperus filipes: Rare, only found so far on open ridge soil derived from andesite, with some detritus from trachyte.

Cyperus fulvus: Very common on open ridge slopes, soil derived from andesite and amphibolite rocks; does not transgress on to acid soils as a rule.

Cyperus difformis: Common in creek beds in conglomerate country and moist sandy spots in gullies.

Cyperus Novae-Hollandiae: One of the larger kinds, rather coarse. Not common, around clay waterholes in gum-topped Box (*Eucalyptus hemiphloia*) country on slate with indifferent drainage.

Cyperus ferax: Only a few of this species are found here and there around clay waterholes in slate country.

Cyperus Bowmanii: This is often met with in partly cleared forest with soil of an open character from trachyte.

Cyperus umbellatus: Very common, usually associated with *C. fulvus* on calcareous sandy loam soils from amphibolitic rocks on low ridges.

Cyperus lucidus: The most common of the larger kinds of this genus. Found on the banks of most of the larger water courses where it contests the soil site with *Xerotes longifolia*; found in both exposed and well sheltered situations.

Kyllinga monocephala: This is not a very common plant although found on a fairly wide range of soils, from andesitic loams to conglomerate gravels.

Heleocharis cylindrostachys: Common. Semi-aquatic, found on creek beds and clay waterholes.

Fimbristylis monostachya: Found in numbers on the lower slopes in well sheltered bloodwood (*Eucalyptus corymbosa*)—mahogany (*Tristania suaveolens*) forest, soil from porphyry or trachyte detritus.

Fimbristylis diphylla: The most widely distributed of all the family. On open black soil flats (some years ago) as much as an acre of ground would be occupied by this species, some 2 feet high. In wet grass on sandy ridges plants 6 inches high are numerous. With the exception of granite hills and badly drained flats, all types of soil favour this species.

Fimbristylis microcarya: Common in well sheltered bloodwood (*Eucalyptus corymbosa*) and Rose She-oak (*Casuarina torulosa*) country on low hills, soil derived from quartz-trachyte and trachyte.

Fimbristylis setacea: A few patches of this are met with in second growth forest, soil a sandy loam.

Fimbristylis cyperoides: Has a fairly wide range as regards the type of forest association it favours. It is met with in narrow leaf Ironbark (*Eucalyptus crebra*) country on soils derived from andesite, in Sugar Gum (*Angophora lanceolata*) country on soils from rhyolite. In the latter, however, much smaller plants.

Fuirena glomerata: Fairly common in most seasons. Favours a moist, sandy soil, where it grows up to 2 feet high.

Rhynchospora longiseta: This is one of those species which are very common one year and rare other years. Last summer an area of half an acre occupied by this species in granite or conglomerate country could be found, this season (1934-35) very few plants can be found where the species was numerous last year.

Lepidosperma concavum: Not uncommon on high granite hills and in Red Ironbark (*Eucalyptus sideropholia*) forest, where it is fairly open. One of the drought-resisting members of the family.

Lepironia mucronata: Confined to the low flats of the coastal peneplain, where it fringes the Tea Tree (*Melaleuca leucadendron* var. *mimosoides*) waterholes several feet deep to the exclusion of other plants. The soils of these flats are derived from ancient (Paleozoic) tuffs, slates, and porphyries, intermixed with detritus from conglomerates, ash-like in texture.

Gahnia aspera: Rather rare, a few plants being found on high granite with little shelter, and it is rather curious that with the exception of a couple of plants found growing with some rain-forest trees and shrubs among angular boulders of andesite, the only others of this species seen was in the dense shade of a rain forest.

Cladium glomeratum: Very rare, only a few plants being found on the margin of shallow waterholes in the same locality as *Lepironia mucronata*.

Cladium articulatum: Unlike *C. glomeratum*, this is very numerous on small creeks where the soil is of an alkaline nature, especially where some clearing or ring-barking of the timber has been done some years previously.

Scleria Brownii: Found on moist soils, but seldom if ever in numbers. On granite hills somewhat exposed to sheltered slopes on trachyte slate, it is possible to find an odd specimen of this.

Stenophyllus barbatus: Very rare, only an odd plant being found growing in sand in creeks where the adjoining ridges are of conglomerate and trachyte.

Cyperus rotundus: This is not common in the Eucalyptus parkland, but is found in numbers growing in railway ballast, where it appears to have taken a strong hold.

It may be of interest to note that out of the thirty species enumerated, only *Cyperus fulvus*, *C. umbellatus*, *C. gracilis* (rarely) and *Scleria Brownii* are found on the red volcanic loams.

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PROCEEDINGS.

EVENING MEETING, 19th AUGUST, 1935.—The Chair was occupied by the President, Mr. G. H. Barker, and about 33 members were present. Misses L. J. Heath and E. Simpson were elected members of the Club. The principal business of the evening were two lectures on North-western Queensland, the first by Mr. J. E. Young on general features, with particular reference to zoology and larger fossils; the second by Mr. S. T. Blake on the botany of the region. Mr. Blake illustrated his remarks by a series of very fine lantern slides and by a number of specimens of grasses, sedges and other plants, some of which had not previously been recorded for the State. Dr. Malaher exhibited a book of notes on birds in manuscript by John Gilbert, collected for John Gould.

WILDFLOWER SHOW, SEPTEMBER 14th.

Owing largely to heavy rain at the beginning of the week the flowers were not so abundant as in some previous years, but the specimens received were good and varied. They included specimens from Rochedale (Mrs. Estelle Thomson), Sunnysbank (Miss B. Sheldon,) Badgen (Mr. K. Baird), Eumundi (Orchids from Miss Ball), Coolum (Mrs. Yabsley), Crohamhurst (Mr. Inigo Jones, flowers of *Alphitonia Petrici*), Rockhampton (Mr. Barnard, flowers of *Dendrobium undulatum*), Bribie Island (Miss Davies), Stradbroke Island (Mr. Ahlberg), Tamborine Mountain (Mrs. H. Curtis), Albert River, a very comprehensive collection (Mr. and Mrs. D. Curtis), Canungra (Miss Toms), Tugun (Mr. G. H. Barker), Cudgen (Mrs. and Miss Clark). Thulimbah (Mrs. Slaughter).

Interstate specimens consisted of a donation from Miss S. Y. Harris, Sydney, a collection of Victorian plants from the Field Naturalists' Club, Melbourne, and of South Australian plants from Mrs. L. E. Page, Myponga, and a parcel of flowers representative of the Sydney sand-

stone from the Rangers' League of New South Wales. A wonderful collection of Australian wildflowers from the garden of Mr. Burdett, Basket Range, South Australia was tabled. In addition to the Australian plants, this collection included several Proteas from South Africa, and created considerable interest.

Native plants in cultivation included a very comprehensive series of Wattles cultivated at the Sherwood Arboretum and forwarded by Mr. E. W. Bick. Other exhibits included Crotalaria and Corai tree from Mrs. Clark, Chorizema from Mrs. G. A. Rowley, Native Orchids, Hickbeacha Tree and Tecoma from Mr. J. E. Young, Brown Boronia from Tambourine Mountain, a collection of specimens from the Botanic Gardens, Brisbane, and a very fine specimen of the New South Wales Waratah, grown by Mrs. Rankin at Beechmont.

Eight State School exhibits were received, prizes being awarded to Thulimbah (Granite Belt), St. Bernard Estate (South Coast) and Landsborough (North Coast). Competition for wildflowers arranged for decorative effect attracted 14 entries, prizes being awarded as follows:—Miss D. Williams, first; Mrs. G. A. Jackson, second; Mrs. D. Curtis, third.

Miscellaneous exhibits included a model of a Tunny Fish by the Director of the Queensland Museum, shells by Mr. H. W. Hermann, insects by Mr. F. W. Perkins, a set of named cuttlefish by Mr. H. Bernhard, a collection of mosses by Miss Carrick, paintings of native flowers by Mrs. Estelle Thomson and photographs of wildflowers and other natural history objects by Mrs. H. Curtis, Mr. R. Higgins, Mr. H. Tilse and others. Thanks are due to Dr. D. A. Herbert and Mr. S. T. Blake for judging and to the numerous helpers who assisted in arranging the flowers and making the show a success.

EVENING MEETING, SEPTEMBER 16th, 1935.—

The Chair was occupied by the Vice-President, Mr. J. E. Young, and about 34 members were present. Miss P. Horsley was elected an ordinary member of the club. A donation of books, mostly on conchology, was received from Miss G. Wood. The principal business of the evening was a lecture by Mr. H. W. Hermann on the romance of steel, illustrating his remarks with a series of pictures of the Newcastle steel works and of the places where the necessary materials are produced and the methods of transporting them to Newcastle.

EVENING MEETING, OCTOBER 21st, 1935.—

The Chair was occupied by the President, Mr. G. H. Barker, and about 40 members were present. Reports of the

excursion to Enoggera Waterworks were given by Dr. E. O. Marks (geology), and Mr. G. H. Barker (ornithology). Mr. J. E. Young exhibited several specimens of native orchids grown in his garden. These included three specimens of *Sarchochilus* making a good show, namely, *S. Fitzgeraldi*, *S. falcatus* and *S. Hartmanni*. A very fine series of coloured lantern slides made from drawings of wild-flowers was shown by Mrs. Estelle Thomson. An interesting lecture on "Birds and Their Nests," illustrated with lantern slides, was given by Mr. G. H. Barker.

EVENING MEETING, NOVEMBER 18th, 1935.—The Chair was occupied by the President, Mr. G. H. Barker, and 38 members were present. The principal business of the evening was a lecture by Dr. W. H. Bryan (Queensland University) on volcanoes, a resume of which is printed in this issue.

CANBERRA, THE AUSTRALIAN CAPITAL CITY AND ITS TREES.

(By E. W. Bick, Curator, Botanical Gardens, Brisbane.)
(Presidential Address delivered before the Queensland Naturalists' Club, 18th February, 1936.)

A visit to Canberra must impress all nature lovers, when they look around and see a large number of beautiful trees, all planted within a comparatively short space of time. The Commission in charge at the commencement of laying out of the Australian Capital City were fortunate in their choice of Superintendents, first Mr. Weston, who had charge for a number of years of the raising and planting of trees and carrying out the ground work of design, then his successor, Mr. A. E. Bruce, another enthusiastic horticulturist, who has had charge approximately eight years, and who has the history of most of the trees at his finger tips. In this he is assisted by the splendid system of records kept. Parliament House buildings cover four acres of land, taking this as a centre, from the front the roads radiate in wheel fashion, with Parliament House as the hub, the main avenues are named after the State capital cities, and are intersected by cross roads or avenues. The area attached to Parliament House is 168 acres, with about seven miles of foot-paths, apart from roads, and approximately 16,888 trees and shrubs have been planted in this section. I don't propose to weary you with a long list of names of trees, but will briefly run through the principal kinds planted.

Commencing with the Acacias, *Acacia Baileyana*, the Cootamundra Wattle, is the chief one grown, named in honour of Frederick Manson Bailey, for many years

Government Botanist of Queensland, this fine wattle grows well in Brisbane, but does not usually flower very well, as the flower buds form but do not open. A colder climate suits it better; in Canberra it does remarkably well. *Acacia decurrens*, known as the Green Wattle from its bark, also as the Black Wattle from its dark foliage, and its variety, *A. mollissima*, are the only other wattles that have been used to any great extent, but specimens of many others may be seen, including *A. pycnantha*, the Golden Wattle of Southern States, also *Acacia melanoxylon*, the Tasmanian Blackwood, *A. prominens*, which is something like *A. linifolia* and *A. podalyriaefolia*, our Silver Wattle, that looks very unhappy.

Coming to the Acer or Maple family, numerous forms of *Acer japonica*, the Japanese Maple, are grown chiefly as shrubs. In their new spring growths, also with their autumn tints, the colourings of these dainty Maples are very beautiful. *Acer platanoides*, the Norwegian Maple, is a tree of fair size, with glorious yellow tones of foliage in autumn. *Acer pseudo-platanus*, the Sycamore Maple, is a large tree of many forms; it has large five lobed leaves, sometimes of a purplish red underneath, beautiful in young growth, also in autumn tints. *Acer rubrum* is a North American species, known as the Red, Scarlet or Swamp Maple. The flowers are red or scarlet, the foliage has beautiful tints, and the tree is one of the largest in growth of the maples.

The only *Araucaria* I noticed was *A. Bidwillii*, our old friend the Bunya Pine. It was not happy, but at Duntroon, the abandoned for the present military training establishment, there are two large specimens growing in the garden of one of the original houses of the district. Mr. Bruce is hoping that the Bunya will thrive better later on in Canberra, when sheltered by other large conifers. Of the Cypress Pines, *Callitris calcarata*, the Black Cypress or Wide Bay Cypress Pine, is well represented, also *C. cupressiformis*, the South Queensland Cypress, and *Callitris glauca*, the more inland species. *Cedrus* is one of the most beautiful genus of conifers. *Cedrus Libani* is the Cedar of Lebanon, which tradition informs us provided the cedar for the construction of King Solomon's Temple. *Cedrus Atlantica* is the Mount Atlas Cedar, a large pyramidal tree growing up to 120 feet in height, and *Cedrus deodara* is the Himalyan Cedar, of somewhat similar growth to *C. atlantica*, but its branches have a rather more drooping habit; all three are featured largely in Canberra, and are making wonderful growth. A large, fine old specimen of *Cedrus Libani* I saw growing in the grounds attached to the Governor-General's

residence, planted by Mr. Campbell, one of the original owners of the F.C.T., is at present literally covered with seed cones, in fact, I understand this tree provided most of the seed used for raising the trees now being grown in the Capital City.

About ten species of *Cupressus* are planted, *var. fastigiata*, of the Mediterranean Cypress, *Cupressus sempervirens*, is featured largely, upright in habit, with dense growth; they are planted with fine effect between larger growing conifers. They seed freely, in fact, Mr. Bruce complains that in the seeding season the outer branches are weighed down by the seed cones, thus interfering with the symmetry of the plants. *Cupressus arizonica*, larger and pyramidal in growth is another *Cupressus* frequently met with, this Californian species revels in the conditions at Canberra, and its pleasing glaucous colour is quite a feature. *Cupressus Benthamiana*, and its variety *Knightiana*, both thrive well, and are noticeable for their somewhat horizontal branches and pyramidal head. *Cupressus Goveniana*, rather slender in growth, has usually spreading branches that form a fine contrast to the more compact forms. *Cupressus Macnabiana* is one of the compact type forming a dense pyramidal head: it has not been planted as freely as some of those already mentioned. *Cupressus macrocarpa*, the Monterey Cypress, does well; it is a quick-growing species with horizontal branches. *Cupressus Lambertiana* and *C. Lambertiana var aurea*, are really forms of *C. macrocarpa*, the golden tints of the variety *aurea* contrast well with a background of dark green. One of the most noticeable is Lawson's Cypress, *C. Lawsoniana*, placed in another genus by many botanists as *Chamaecyparis Lawsoniana*, owing to the seed cones taking two years to ripen. It is a large tree with horizontally spreading branches, often pendulous; it is one of the most beautiful of conifers, with golden and other forms, in fact, it is estimated there are 80 varieties of it being cultivated in European nurseries. Lawson's Cypress is quite at home in the Capital City. *Cupressus toulosa*, and its variety *majestica* from the Himalayas are pyramidal in growth, with more or less pendulous branches, with rather ruffled foliage, a careless informal type of beauty when compared with the sleek well-groomed appearance of say *C. sempervirens var fastigiata*. *Libocedrus decurrens*, the Inceuse Cedar, is another fine conifer; it has beautiful foliage, somewhat flattened, and the tree forms a symmetrical pyramid of great beauty.

Of the Junipers, *Juniperus procera* does well, also *Juniperus virginiana*; they are probably the largest grow-

ing trees of this genus; the first named comes from the mountains of East Africa, and the second, *J. virginiana*, the Canadian Red Cedar, is also found in the United States of America. *Juniperus chinensis*, the Chinese juniper, in some situations grows into quite a fine tree, in others where conditions are not favourable, it is only a shrub with procumbent branches. *Juniperus afriana* does well, also *Juniperus hibernica*, the Irish Juniper, of compact habit, and foliage with glaucous tints; it is rather slow in growth. A long sloping bank on a terrace at the back of Parliament House has been planted with *Juniperus procumbens*, also known as *J. prostrata*; this plant as its name indicates has a trailing habit; hundreds of plants have been used and the whole bank will soon be covered with their bluish green, or steel blue foliage. Another fine tree is *Retinospora plumosa*, a Japanese conifer of dense growing habit, the foliage of which is plumed or feathery; some dwarf growing forms seen were very beautiful shrubs, with plumed ends of foliage. *Sequoia* is a small genus of Californian conifers consisting of two species: *Sequoia gigantea* (the Big Tree), and *Sequoia sempervirens* (Californian Redwood); *S. gigantea* is reputed to be the largest of known trees. It is stated that a prostrate tree, one that had blown down, was measured in California and found to be 435 feet in length, and 110 feet in circumference at base. At Canberra many *Sequoia gigantea* have been planted, and are making fine trees; *Sequoia sempervirens* also promises well.

Thuja orientalis and its *var. aurea*, the golden form, are doing well; they belong to the type vernacularly known as the Book Cyprresses from the flattened appearance of the branchlets. I have left the *Pinus*, or true Pine family, rather late; this is a large genus, comprising over 50 species, with numerous forms or sub-species. The chief kinds grown at Canberra, are *Pinus radiata*, or *Pinus insignis*, as it is often called, indigenous in South California, where it is known as the Monterey Pine. It is a handsome species with bright green needle-like foliage, the tree is of rapid growth, and bushy habit when young; it is planted largely in the Capital City for wind breaks, also at Mount Stromlo, on the slopes of which a forestry plantation of a million trees shows up well. *Pinus canariensis*, the Canary Island Pine, is also being planted, any many fine trees may be seen. In some situations this beautiful tree will grow very quickly, even faster than *P. radiata*. Other *Pinus* being tried are *P. flexilis*, the Limber Pine, and *Pinus ponderosa*, the Yellow or Bull Pine. I have arranged to send Mr. Bruce seed of *Pinus*

longifolia, the Himalayan Pine, for trial; this species does well at Brisbane. *Cryptomeria japonica*, the Japanese Pine, is doing well, also many plants of *C. elegans*, which is rather denser in growth; both promise well. The many conifers mentioned are outstanding in their beauty amongst evergreen trees, even at present, which will be enanced in the future, and have a wonderful effect on the landscape of the Capital City.

Regarding the deciduous trees, many of which are grown for their flowers, *Catalpa bignonioides*, from North America, is a large leaved tree with large panicles of white bignonia-like flowers that are speckled with purple and yellow. Of the genus *Crataegus*, or Hawthorns, many fine forms are grown, some as hedges and wind-breaks; all were in fine growth at the time of my visit (January) and seeding freely. In the Spring they are a fine sight covered with masses of small white flowers, the true May; and in Autumn the clusters of red berries make a blaze of colour. The flowering plums and peaches must present a delightful spectacle in the Spring, about ten kinds of *Prunus* are used, the principal one being *Prunus Pisardi*, really a form of the Cherry Plum; it has been planted on both sides of the Brisbane avenue for some distance, the plant has purplish red leaves that have quite a good effect. In Winter the leaves fall off, and in the Spring the plants are a mass of pink flowers. The plant thrives well here (Brisbane), it has been growing in the Botanic Gardens for many years, and could be used as a street tree in cold localities. Forms of *Prunus persica* (*Amygdalus persica*), the flowering peach, are also used, the flowers must be beautiful in Spring. The Japanese Cherries also do well. The Federal Government some years ago refused a gift offered by the Japanese Government of 6,000 flowering Cherry plants, on the grounds they might introduce disease. Forms of *Pyrus*, the genus that includes the apple and pear, are also used, also the Cydonia or Flowering Quince; all of these provide a feast of beauty in the Spring.

A closely allied plant, *Sorbus aucuparia*, also known as *Pyrus aucuparia*, the Mountain Ash or Rowan Tree, is largely planted. The tree is shapely in growth, with pinnate leaves, and carries large clusters of orange red berries that at present (January) are of great beauty; it is one of the most beautiful of all berried plants. Poplars are largely grown in about six species. One of the best is *Populus Bolleana* which forms a fine tree; *Populus pyramidalis*, the Lombardy Poplar, upright in growth, has a fine landscape effect. *Populus nives*, the Silver Poplar,

forms a compact tree, but like many of this family, suckers freely and is apt to become a nuisance. *Populus deltoides*, the Southern or Carolina Cotton Wood, as it is called in America, is a good tree; it has a deliquescent habit, that is, the top breaking into numerous large branches of equal importance, with the centre somewhat open. The Golden Poplar has so far not done well, Mr. Bruce is quite disappointed with it. In the Melbourne Botanic Gardens there are some magnificent specimens of Golden Poplar. *Platanus orientalis*, the Plane Tree, thrives well and some fine specimens are to be seen.

Passing on to the Quercus or Oak family, many species are grown, most of which have attractive foliage. Some beautiful very large English Oak, *Quercus robur*, are growing in the old garden at Duntroon, the species most featured in Canberra is *Quercus palustris*, the American Pin Oak, the leaves deeply lobed and turn a bright red in Autumn. Some lines of this beautiful oak seen planted on roadsides in centre of well-kept turf plots must provide a wonderful effect in Autumn, the new growth in Spring must also be very fine. Other oaks noticed were *Quercus ambigua*, and a form of it *var rubra*, both of which are making good growth, they also have dark red foliage in Autumn. *Quercus paniculata* is another to be seen, a fine shapely tree, apparently of rapid growth. *Quercus macrocarpa*, the Mossy Cup Oak, in reference to peculiar shape of Acorn cup, is also being grown, it is large in growth, forming fine trees. Many other species, including the live or evergreen oaks such as *Q. ilex* and *Q. virens* are planted.

Several species of Ulmus or Elm are grown, *Ulmus americana*, the American White Elm, has rather a wide spreading habit that makes it a useful shade tree, it is quick in growth and good for avenue planting; the variety *pendula*, a drooping form with Weeping Willow-like habit, is often grafted on a strong stem of the type form, and used as a specimen plant on lawns, the variety *aurea*, the golden form, provides a fine effect with its golden tipped foliage. Mr. Bruce is very keen on *Ulmus parvifolia*, the Chinese Elm, being sometimes known as *Ulmus chinensis*, it is semi-evergreen with small foliage and drooping habit. *Ulmus vegeta*, a form of *Ulmus hollandica*, also known as the Dutch and Belgian Elm, is a fine tree of rapid growth, there are a number of forms that are supposed to be natural hybrids; *Ulmus campestris*, the English Elm, is a tall growing tree with ascending and spreading branches that form a fine head; unfortunately this species has the bad habit of suckering freely. Most of the Elms are

strictly deciduous and provide light coloured, creams and light yellow autumn tint. No list of trees would be complete without the Beech and Birch being mentioned, *Betula populifolia* or *Betula alba* as it is called sometimes, is the White or Silver Birch, forms a very attractive tree, the silvery bark on trunk and main branches is a noticeable feature, and the populus-like foliage is bright and shining. The *Fagus* or Beech is also planted, one of the most striking of this family is a form of the European Beech, *Fagus sylvatica*, with purplish foliage, and known as the Copper Beech. I saw fine specimens both on the Dandenong and Macedon Ranges in Victoria, but the plants at Canberra were not happy, making only fair growth. Mr. Bruce informed me he had been disappointed with its growth so far; it may be the climate is too dry, or that the trees require more shelter. The same remarks apply to Rhododendrons, but the trouble here is more likely to be lack of shelter, which will be remedied when the conifers have grown larger.

Ilex aquilifolium, the English Holly, does fairly well, some fine plants are to be seen, possibly it would do even better with a moister climate judging by what I saw growing on the Dandenong and Macedon Ranges. It is estimated there are 153 varieties of this beautiful red-berried plant that have been described. The true Ash, *Fraxinus*, thrive well; one I noticed was *Fraxinus sambucifolia*, also known as *F. nigra*, the Black Ash. *Fraxinus* trees have pinnate leaves that provide fine autumn tints; other species grown are *Fraxinus caroliniana*, the American Water Ash, and *Fraxinus oxycarpa* a South European kind.

I must not overlook the Eucalypts. *Eucalyptus globulus*, the Tasmanian Blue Gum, seems quite at home, and some fine trees may be seen. *E. Maidenii*, that comes very near the Tasmanian species botanically, being in its native region, naturally does well. *Eucalyptus rubida* is probably the gum that has been most freely planted, indigenous in Southern N.S.W. and Northern Victoria, and known in many districts as Candle Bark; it is compact in growth and the bark on trunk and main branches has beautiful tones of silver and brown, that contrast well with the drooping foliage, also against the dark green of conifers. I am looking forward to obtaining plants of this and several other species for the Sherwood Arboretum, Brisbane. Many other Eucalypts are grown, such as *E. cinerea*, *E. melliodora*, *E. maculosa*, *E. viminalis*, *E. Smithii*, *E. Macarthurii*, and *E. tereticornis*. Our old friend, the Silky Oak, *Grevillea robusta*, thrives fairly well, although with frequent frosts in winter the tops are cut back, like

an annual pruning, but after a few years they form bushy trees. This also applies to the Kurrajongs, *Brachychiton diversifolium*, that after being cut back in the same way a few times form nice bushy topped trees.

Robinia pseudo-acacia, the false Acacia, is quite at home; it is rather thorny but produces racemes of sweet-scented white flowers. I have seen this tree growing on the Darling Downs (Queensland), but it often becomes a nuisance by suckering freely. The *Salix* or Willow family do well. *Salix Babylonica*, the Weeping Willow, is in great form along the Molongo River and other moist places. *Salix sacramento* that forms a nice compact tree, thrives well, and I also noticed *Salix rubra*, the Pussy Willow, doing well. Some of the Casuarinas or She Oaks are being used, chiefly *Casuarina Cunninghami* and *C. glauca*. *Taxodium distichum*, the Virginian Swamp Cypress, is also being grown; this graceful American conifer does remarkably well in Melbourne, fine plants are also to be seen in the Rockhampton and Brisbane Botanic Gardens indicating it is not at all fussy about climate.

Cercis siliquastrum, the Judas or Love Tree, is small in growth, and a flowering plant of great beauty, the foliage at first glance is not unlike that of the *Bauhinia*, but with the centre division of the leaf lacking. The flowers are pinkish purple, there are also other forms with flesh coloured and white flowers. *Syringa vulgare*, the Lilac, is another fine flowering plant of the Spring, but is really perhaps a large shrub. *Arbutus unedo*, the so-called Strawberry Tree, also known as the Irish Strawberry Tree, should be noted; it is indigenous to the west of Ireland and South Europe, the foliage is dark green, and its white flowers are borne on terminal clusters, but the chief beauty is the scarlet fruit, with very much the appearance and shape of medium-sized strawberries; plants seen at Canberra were both flowering and setting the fruit freely. The bright scarlet fruit remain on the tree for long periods and provide a fine effect. A visit to the Yarramula Nursery with an area of about 20 acres under cultivation, under the guidance of Mr. Bruce, was an interesting experience. The nursery is in two divisions, the Pot Section where most of the Conifers and other ever-green trees and shrubs are raised, and the open ground section where thousands of deciduous trees and shrubs are grown. The plants from the latter section are handled in winter, before the new Spring growth commences. The stock of plants in nursery in March, 1934, was approximately 77,000 of this number slightly over 38,000 were in the open ground section, and nearly 39,000 in the pot

division. The figures were kindly supplied by Mr. Bruce. Judging by the stock plants used for propagating purposes, also by the appearance of the plants in both divisions, the soil and conditions are extremely well suited for nursery purposes, as it would be difficult to find a healthier stock of plants.

I trust you did not expect a full list of trees growing at Canberra. I have merely mentioned the principal ones noticed during a few hours' tour around the City, nor is there time to describe the various features of the Federal Capital, nor to mention the many beautiful shrubs seen. Everything is on a large scale, there are miles of dwarf hedges taking the place of fences, and about 80 miles of City streets planted with trees and shrubs, also plantations of shelter belts, and sports grounds encircled with trees. The Government buildings (they really constitute Canberra) have large areas attached to them that are planted up with trees and shrubs, the six hotels built and owned by the Government, some of which are fully licensed, and leased, all have spacious well kept surroundings. The Hotel Canberra alone has twelve acres of land laid out in lawns and flower beds, also shrubs and trees, tennis courts and bowling green. The planting of streets, reserves, sports grounds and school grounds, in fact, practically all tree and shrub planting in the city is carried out by the Parks and Garden Section, with Mr. Bruce as Superintendent under the Department of the Interior, and to date approximately 734,000 trees and shrubs have been planted in the Canberra City District, and over 2,000,000 outside the City District, the latter include the Forestry plantations at Mount Stromlo already alluded to. On the establishment of the Australian School of Forestry, the plantations were handed over to the Forestry Department.

The tree-planting schemes as carried out at Canberra, provide an object lesson to all interested in trees, and I suggest that a visit paid to the Federal Capital either in Spring when the many flowering plants are at their best and the deciduous trees clothed with new growth; or in the Autumn when they are producing glorious autumn tints, and berried plants provide a wealth of bright colours, will well repay visitors interested in plant life.

VOLCANOES.

(By W. H. Bryan, M.C., D.Sc.)
(A Lantern Lecture to the Queensland Field Naturalists' Club, given on the evening of 18th November, 1935.)

Although we have no active volcanoes in Queensland, we have abundant evidence of volcanic activity in

the not so distant past. In his famous Geological Map of Queensland, published in 1892, Dr. R. L. Jack shows about fifty "Volcanic Foci" and others have been discovered since that date. Probably the best known of these recent volcanoes are represented by the crater lakes of Barrine and Eacham in the north and the Coalstoun Lakes in the south.

Perhaps before we proceed any further, we should decide what we mean by a volcano. Dr. Johnson in his famous dictionary defined a volcano as a "burning mountain." Such a definition is simple and graphic and has met with wide acceptance, but it is not literally true. Volcanoes do not burn in the ordinary sense that a fire burns and, moreover, they are not necessarily mountains, for while to a geographer a volcano is a hill, to a geologist it is a hole. Here is a modern definition of a volcano in the geological sense: "A volcano is a channel through the outer solid crust of the earth, communicating with a portion of the heated interior, through which hot gases, molten lava and fragments of rock pass upwards to the surface. The eruptive activity may take place quietly or with explosive violence; it may be continuous or spasmodic. It may or may not give rise to a mountain of accumulation around the orifice of ejection."

Since they combine in themselves phenomena of purely academic interest with matters of more intimately human concern, volcanoes have always received the close attention of intelligent travellers and students, so that a great number of valuable observations of their habits have been recorded from many parts of the world. In recent years, these observations have received notable additions from the modern observatories which (adequately equipped for thorough and continuous study) have been established on Vesuvius and Etna in the Mediterranean, on Kilauea in Hawaii and in Java.

One result of the vast amount of research that has been done on the subject is to show that volcanic activity exhibits itself in so many ways that it is unlikely that one simple explanation will account for every manifestation in all its details.

Some volcanoes are produced by a series of underground explosions hurling dust, ashes and rock fragments through an orifice vertically into the air. These drop down as showers immediately about the crater. As one eruption succeeds another, there is built up first a mound, then a hill, and finally a mountain perhaps thousands of feet in height. In this way are formed some of the most beautifully symmetrical mountains in

the world. In plan they are almost perfectly circular, while in elevation they appear as evenly sloping cones truncated at the top. On comparing pictures of several of those conical volcanic peaks you may notice that some have considerably steeper flanks than others. This variation in slope is very significant and most informative, for the slope of each is determined by what the engineer terms the angle of repose of the ejected material, which in turn depends upon the coarseness of this material. In those instances where the erupted fragments have been relatively large the cones may slope at angles as high as 40 degrees, but where the volcano is made up mostly of small fragments the slopes of its side are correspondingly gentle. If one were to climb to the top of one of these cones of volcanic ash one would find a depression or crater shaped like a funnel with its walls sloping at just the same angle as the outer slopes of that particular mountain.

In addition to those volcanic mountains that are built up entirely of fragmental material violently thrown into the air, we have others that are formed by successive flows of hot liquid lava more or less quietly poured from a central vent. These, too, tend to form cone-shaped mountains but they are usually less symmetrical than the cinder cones as the lava sometimes wells over one side of the crater's lip and sometimes over another. The shape that the mountain ultimately attains will vary, too, with the chemical nature of the lava. Basaltic lavas are so fluid that they flow long distances from the centre of eruption before cooling into solid rock, in this way building up mountains covering large areas with very gentle slopes. At the other extreme are those acid lavas rich in silica, which are so sticky and viscous that they are unable to flow very far from the vent and, consequently, build up very tall and steep volcanoes. Interesting examples of the former type of mountain are found in the volcanoes of Hawaii. Mauna Loa, the greatest of these, rises 14,000 feet above the sea, but measured from the ocean floor, from which it has been built, it is over 30,000 feet high. Its diameter at sea level is eighty miles and its base covers many thousands of square miles of the ocean floor. The crater of this giant volcano is three miles in diameter and 1,000 feet deep. But in spite of its enormous size, this mountain is not at all impressive as viewed from afar. This is due to its very gentle slopes, which vary from only three degrees to eight degrees and which are a true indication of the liquidity and hence of the chemical composition of the lava. Contrast with this giant but almost flat

volcano that of Mont Pelee in the West Indies. Here the lava, as a result of its chemical composition, was so viscous that instead of flowing over the surrounding land it was forced up and up, higher and higher into the air, until finally it formed an almost needle-like projection over seven hundred feet above the crater. It is probable that our Glasshouses in Southern Queensland represent the relics of volcanic mountains similar to Mont Pelee, as do the bell-shaped domes of Auvergne in France.

Of course, not all volcanoes are simply ash cones or lava cones. Many, including some of the largest, are made up partly of fragmental material and partly of lava flows. Such composite volcanoes also give rise to conical mountains. Some of these are, naturally enough, somewhat irregular, but others are among the most graceful and beautiful mountains of the world. The lavas from these volcanoes are sufficiently viscous to prevent their spreading very far, while the larger of the ejected blocks also tend to accumulate around the crater. But the relatively finer ash falls progressively farther from the centre of eruption. Since each of these grades of material has its own angle of rest, there is thus built up a mountain with a very characteristic profile. From the lip of the crater the slope is at first steep, at say 30 degrees, but as the distance from the crater is increased and finer material is encountered, the angle of the slope gradually diminishes until towards the base it is almost horizontal. The graceful curve thus developed is well illustrated by the world-famous Fuji Yama—the sacred mountain of Japan—but it is almost equally well developed in many other large volcanoes.

But in spite of their many and obvious differences, all volcanoes have this much in common, they transfer heated material from the interior of the earth to the surface. To understand how this is done we must investigate two main features, namely, the nature of the reservoir from which the volcanic products are obtained and the processes by which this material is propelled to the surface. Let us first inquire into the nature of the reservoir.

One early idea based on the Nebular Hypothesis was that the earth, beneath a thin solid shell, was entirely molten, thus providing one enormous source of supply for volcanic eruptions. The evidence against this simple concept is so strong that it has been almost universally abandoned.

The supporters of the Planetismal Hypothesis argue that the earth is solid throughout with the exception of

a number of tongues of molten material which are arranged radially, like the spokes of a wheel and that it is these liquid tongues which act as feeders to the volcanoes. There are many theoretical objections to this hypothesis, so that it is rapidly declining in favour even in the United States, the land of its birth.

A less objectionable theory, from the physical point of view than either of the preceding, and one that has a considerable number of adherents at the present day, holds that there is a continuous zone of molten material sandwiched between the solid outer crust and an equally solid centre. To many authorities, however, the way in which earthquake waves are transmitted appears to preclude any completely liquid zone.

This difficulty was overcome, but fresh ones were created by the suggestion that each volcano was supplied independently from its own particular reservoir set in an otherwise solid zone. But such a view of complete independence of neighbouring volcanoes is hardly in keeping with the history of many volcanic regions.

A more modern picture of the zone immediately beneath the solid crust shows us a sort of honeycomb or sponge-like structure made up of an irregular solid framework filled with a more or less continuous mass of liquid lava.

One general scheme which has found wide support is based on the supposition that, below the solid crust, there is a zone of material almost at the melting point so that a slight change in conditions may bring about local liquifaction and thus provide a reservoir for an overlying volcano. Such a change from solid to liquid might be brought about either by relief of pressure or by an increase of temperature. In the former case, the relief of pressure might result from the arching upwards of a portion of the solid crust or by some other earth movement on a large scale. In the latter case liquefaction might be brought about, as suggested by Professor Joly, by the slow self-heating of the mass due to the radioactive transformations continually taking place within it.

Since it seems impossible at present to decide on the precise nature of the volcanic reservoirs, we must be content with the knowledge that there are below the active volcanoes sources of supply.

Our next inquiry concerns the manner in which the various volcanic substances are carried to the surface and there ejected.

Space does not permit us to examine the views of the ancients on this subject (although they are vastly

entertaining) except to mention the common belief that volcanic eruptions were due to the action of violently raging winds imprisoned in the bowels of the earth.

Coming to more modern times we see first the tendency to regard volcanoes as "burning mountains" in a literal sense and as due to the combustion of such inflammable materials as coal and petroleum. A later and more plausible explanation was based on the spontaneous decomposition of sulphur-bearing minerals and one investigator in the year 1700 produced what he thought was a model volcano by making a paste of water, sulphur, and iron filings and burying the mixture in the ground. The material soon began to swell and forced the ground above it into a dome, through cracks in which sulphurous gases were given off and other volcanic effects simulated.

Another early writer, convinced that ordinary combustion was out of the question, appealed to electricity as the source of heat.

Sir Humphrey Davy, Professor Daubeny and other chemists held that volcanic activity was due to violent chemical reactions such as the oxidation of the alkalies and alkaline earths.

Still another school among whose members were Humboldt, Lyell and Dana saw in eruptions the result of great quantities of water contained in the molten lavas suddenly becoming converted into steam. Some thought that the contained water was part of the original content of the lava, others suggested that it was rain water which had percolated through the ground just as it does to feed hot springs, while still others pointed to the frequent occurrence of volcanoes in or near the oceans and insisted that the water which caused volcanic eruptions originated in the sea.

The last of these suggestions was widely accepted, although in its original crude form it was far from convincing. It was the physicist Arrhenius who in the beginning of the present century clothed this old idea in modern dress. Shortly stated, his hypothesis is as follows:—The sea floor acts as a semi-permeable membrane which allows the water to percolate downward but will not allow the molten rock to penetrate upward. Hence more and more water accumulates in the lava which is forced upwards in the pipe of a volcano until it reaches a position where the pressure is sufficiently low for the imprisoned water suddenly to flash into steam, thus producing a violent explosion.

Whether the water originally came from the ocean in some manner such as this, whether it came from rain-

water soaking through the ground or whether it was always present in the lava geologists are generally agreed that the more explosive manifestations of volcanic activity are due to the sudden liberation of enormous quantities of steam.

But what of those very different eruptions where great quantities of very fluid lava quietly well out of fissures and flow like water over the land? By their very nature these appear as if they were squeezed out rather than blown out and it seems almost certain that they are due simply to displacement. Indeed, many geologists think that the major control behind all volcanic phenomena is pressure of this type due to the relative movements of great blocks of the earth's crust. In support of this contention they point out that volcanoes commonly occur along the margins of the continents, each continent probably representing one great block and its coastline representing the hinge line between it and the neighbouring oceanic block. Thus J. W. Gregory is of the opinion that "The distribution of volcanoes shows that they are formed where sinking blocks of the crust exert such heavy pressure on the plastic material below that it is forced to the surface up the fractures around the sinking areas."

But while the general upward movement of lava may be brought about in this way, the immediate cause of eruption, especially of the more violent volcanoes seems to be due to the explosive action of high-pressure steam.

This combination of earth movement and steam pressure is the most satisfactory attempt yet put forward to explain this complex problem, nevertheless some modern workers are far from satisfied with it and at the present time two much more complicated hypotheses are in process of elaboration.

One attempts to explain volcanoes in terms of radioactivity, the other in terms of a supposed convectional circulation of the molten matter of the interior of the earth. It is too early yet to say whether either of these is capable of solving all the manifold problems presented by the mechanism of volcanoes.

CENTRAL QUEENSLAND, EASTER, 1935.
A SHELL COLLECTING TRIP IN KEPPEL BAY,

(By H. Bernhard.)

North Keppel Island lies 12 to 15 miles east of the mainland coast and possesses a fauna that is distinct from that of the mainland on the one hand and the Great

Barrier Reef on the other. Having made arrangements four weeks beforehand with Mr. C. B. Finlay, boatman of Yeppoon, I started to get my camp and collecting gear together. The gear is, of course, the main thing. I take plenty of empty tins to pack the good stuff in, glass jars for specimens such as Nudibranchia, etc., formalin, methylated spirits, paper and wadding, and a short 18 inch iron bar for levering and breaking up coral. A carbide bicycle lamp is useful for collecting at night, during low tide and for nocturnal specimens.

Good Friday turned out a fine and glorious day. I fixed my camp just off the beach above high tide mark, well in the wind to keep cool and blow away the sand-flies and mosquitoes. After a dip I set out for a walk to Considine Beach, and although the tide was coming in I managed to get some shells:—*Tectarius tuberculatus* (large ones), *Siphonaria* sp. (unnamed: like *demissis*), *Acanthozostera gemmata* $3\frac{1}{2}$ inches long; *Conus* sp. (near *textilis*: unnamed), various *Chlamys*, Venus's heart urchins, etc.; *Fusinus boardmani*, *Placuna lobata*, *Amusium balotti*, plenty *Nerita costata*, *N. striata*, etc; the chameleon *Planaxis sulcatus*, *Turbo nespilus*, *Drupa marginalba*, *Bembicium melanostoma*, and myriads of *Ostrea cucullata*, our commercial rock oyster, and last but not least a new *Dentalium*.

After dinner I made for Massey coral shelf for a good afternoon's shelling. Cutting across the neck from the settlement at the spit to Massey Bay, I went straight down to the beach and out to the coral shelf, heading east towards Monkey Point collecting as I went. I got one or two clam shells (*Tridacna fossa* Hdly.) good bait—some empty pairs of *Cardium rugosum* (type), gradually swinging round to come back along the water's edge at low or incoming tide. I turned over likely looking stones and nigger head coral in search of material. The species found were the following:—*Clanculus atropurpureus*, *Paulonaria macula*, *Staphylaea staphylaea* (jet black mantle and pale purple shell), *Lycina vitellus*, *Erosaria crosa*, *Erronea erroneos* and *caurica*, *Lycina vanelli*; *Erosaria metavona*, a rare shell, was found there a few years ago; *Melo vars.*, *Megalatraetus arunus*, *Solecardia aurantiaca*, *Arca imbricata*, *Fusca*, etc., *Cardita excavata*, *Spondylus* sp., *Ostrea cerata* in plenty, *Chama pulchella*, *C. reflexa*, *Perna nucleus*, *P. insignumnum*, *Malleus legumen*, *Pinctada tegulata* and other species. Amongst the *Angaria delphinus*, *Sanhalotis varia*, and out of coral I dug out or broke out the following:—*Lithophaga teres*, *L. corrugata*, *Modiolus cinamomea* (sea dates), *Gastrochaena gigantea* and *Jouanetia cumingi*

(rare). I went to bed early that evening as I intended to go shelling by lamp light between 2.30 a.m. and 6 a.m. I lighted the carbide bicycle lamp, and as the tide was more or less right out, made down for the mud flats at the foot of steeply sloping beach and was lucky to procure two beautiful *Phalium arcata* shells and some *Nassonus coronatus*. I went round the spit and along the rock to Considine Beach for more tooth shells and if possible *Thais echinatum*, but the tide had come in too far to procure more than one only, so I scrutinised the beach for other material and got some interesting finds including *Fusinus boardmani*. I made for the mangroves but could not see as much as a broken fragment of *Tellina capsoides*, so came home for breakfast and had a dip and went to bed to make up for loss of sleep. Saturday afternoon, after a good sleep and sorting out and cleaning material I made for Massey Bay again and the coral shelf for more shells of interest like the previous afternoon. I waded out knee deep, but did not do any good, so came back to the drier part of the coral shelf, collecting *Cowries*, *Trochidae*, *Ostreae*, *Chamindae*, etc., and a few *Cerithium echinatum* and *C. pulchrum*. On Sunday I got up about day-break, but the tide was too far in to do much shelling. I did not feel well, so a trip to Rocky Bay was cancelled in favour of one along Shark's Bay towards Monkey Point. A few shells were got; of particular interest was an exquisite *Scaphella caroli* and a few medium-sized *Megala-tractus aruanus*. A few land shells were also got in forest land on the island.

After dinner I took a walk round past Eagle Rock on the western side of the coral shelf and got a nice lot of Bleeding Tooth Nerites (*Nerita polita*). *Thais kienerii*, some *Haliotis asinina*, *Clanculus atropurpureus*, *Limopsis* of sorts, *Cowries*, *San halitis varia*, and a host of other material. The incoming tide put an end to shelling for that trip. I had got a kerosene tin full and two tea tins full; not bad going for three days work single-handed.

On Easter Monday I got up early and had a last look over the reefs at low tide, struck camp, and packed up ready for the boat at 8.30 a.m. After a hearty breakfast I took leave of Mr. and Mrs. D. Phillips, leasees of the island, from whom a hut, shed or house can be had at a reasonable rent for camping and holiday parties. Firewood and water are on the island and plenty of fish and oysters can be had. Twenty-two people went back on the boat to the mainland to catch the train to town that evening, and back to work on Tuesday morning.

**REPORT ON THE EXCURSION TO THE ENOGGERA
WATER RESERVE ON THE AFTERNOON OF
SATURDAY, OCTOBER 19th, 1935.**

(By G. H. Barker.)

Owing to the previous wet days it was doubtful if the excursion would be held, but as the morning of Saturday was fine, a party of fifteen in which the ladies were easily in the majority, assembled at the Ashgrove Tram Terminus at 2.30 p.m., and were transported to the Reserve in the cars of Dr. E. O. Marks and Messrs. G. Rowley and G. H. Barker. On arrival it was seen that the Reservoir was filled to overflowing and in consequence the spillway was in action from end to end, a rare occurrence in the memory of members. One of the first things noticed was the absence of floating vegetation and this was explained by the fact that practically all the hyacinth had been removed and the floating leaves of the *Nymphaea* were all submerged on account of the high water. It was not surprising therefore to find that the Lotus Bird or Jacana was absent, though it did not account for the absence of ducks of all kinds, and the wildness of a few water fowl, e.g., Grebes and waterhens that were seen during the ramble. As the reserve has always been a show place for this type of bird there can only be one reason for this state of affairs, and that is that the birds are subject to a lot of interference, and it would be interesting to learn how this happens in a sanctuary.

At the outset the party rambled off along the northern arm of the lagoon and was considerably hampered by the long grass along its margin and when a snake (? sp.) was seen disappearing into a thicket the party became very careful. Quantities of the little green leak orchid, *Microtis porrifolia* were noticed here but very little else in the way of flowers could be seen. Further on some fine trees of White Cedar and Hibiscus were conspicuous and these with a few *Hibbertias Kennedyas* and *Daviesias* almost completed the list of flowering plants seen during the afternoon.

Birds were much more plentiful and many of them in good voice, particularly the Whip Birds, Whistlers, Honeyeaters and Cuckoos. Three different species of the latter were in evidence and almost as a contradiction to my previous statement that few birds were seen in the lagoon was the fact that no less than four different species of Cormorants, some of them in fair numbers were recorded during the afternoon. The brown flycatcher or Jacky Winter was seen feeding a brood (two) of young

ones, and a solitary white-breasted Sea Eagle was the only raptorial bird noted for the afternoon. Appended is a detailed list of our record for the outing.

1. Peaceful Dove (30. *Geopelia placida*).
2. Bar Shouldered Dove (32 *Geopelia humeralis*).
3. Coot (slaty-billed) (59. *Fulica atra*).
4. Little Grebe (61. *Podiceps ruficollis*).
5. Black Cormorant (96. *Phalacrocorax carbo*).
6. Little Black Cormorant (97. *Phalacrocorax ater*).
7. White-breasted Cormorant (98. *Phalacrocorax fuscescens*).
8. Pied Cormorant (99. *Phalacrocorax varius*).
9. Austn. Spur Winged Plover (133. *Lobibyx novae-hollandiae*).
10. White-Faced Heron (188. *Notophoxyx novae-hollandiae*).
11. White-breasted Sea Eagle (226. *Leucogaster haliaeetus*).
12. Sealy-breasted Lorikeet (256. *Trichoglossus chlorolepidotus*).
13. Little Lorikeet (260. *Glossopsitta pusilla*).
14. Eastern Broad Billed Roller (318. *Eurystomus orientalis*).
15. Laughing Kingfisher (322. *Dacelo gigas*).
16. Forest Kingfisher (324. *Halcyon macleayi*).
17. Pallid Cuckoo (337. *Cuculus pallidus*).
18. Little Bronze Cuckoo (346. *Lamprocoeyx minutilus*).
19. Koel Cuckoo (male) (347. *Eudynamys orientalis*).
20. Pheasant Coucal (349. *Centropus phasianus*).
21. Welcome Swallow (357. *Hirundo neorena*).
22. Spectacled Fly Catcher (375. *Monarcha atrivirgata*).
23. Jacky Winter (377. *Microeca fascians*).
24. Northern Yellow Robin (393. *Eopsaltria chrysorrhoa*).
25. Rufous Whistler (400. *Pachycephala rufiventris*).
26. Grey Shrike Thrush (408. *Colluricincla harmonica*).
27. Magpie Lark (415. *Grallina cyanoleuca*).
28. Eastern Whipbird (421. *Psophodes olivaceous*).
29. Black-faced Cuckoo-Shrike (424. *Coracina novae-hollandiae*).
30. Southern Fig Bird (431. *Sphecotheres Vielloti*).
31. White-throated Warbler (453. *Gerygone olivacea*).
32. Little Thornbill (471. *Acanthiza nana*).
33. Austn. Reed Warbler (524. *Acrocephalus australis*).
34. Golden-headed Fantail Warbler (525. *Cisticola exilis*).
35. Varigated Wren (536. *Malurus lamberti*).
36. Red-backed Wren (541. *Malurus melanocepalus*).

37. White-throated Tree Creeper (558. *Climacteris leucophaea*).
38. Mistletoe Swallow (564. *Dicaeum hirundinaceum*).
39. Black-headed Pardalote (569. *Pardalotus melanocephalus*).
40. Grey-breasted Silvereye (574. *Zosterops lateralis*).
41. White-naped honeyeater (578. *Melithreptus lunatus*).
42. Scarlet Honeyeater (586. *Myzomela sanguinolenta*).
43. Eastern Spinebill (691. *Acanthorhynchus tenuirostris*).
44. Little Brown Honeyeater (597. *Gliciphila indistincta*).
45. Yellow-faced Honeyeater (614. *Meliphaga chrysops*).
46. Noisy Miner (634. *Myzantha melanocephala*).
47. Red-browed Finch (662. *Aegintha temporalis*).
48. Austn. Crow (692. *Corvus ceciliae*).
49. Grey Butcher-Bird (702. *Cracticus torquatus*).

The species number is that of the R.A.O.U. Official Check List.

Part X III

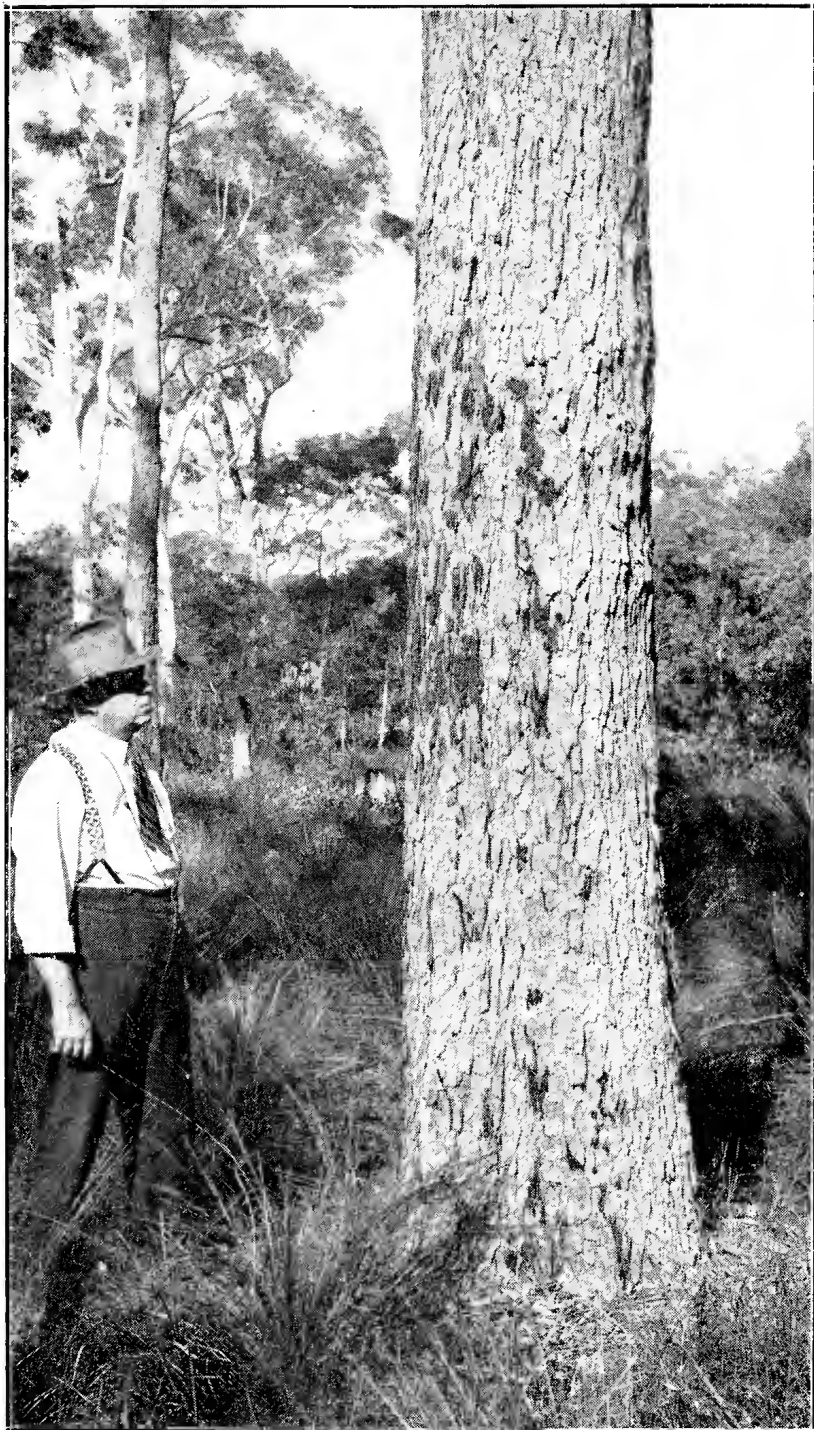
THE EUCALYPTS OR GUM TREES OF THE BRISBANE DISTRICT.

By C. T. WHITE, Government Botanist.

(Continued from the "Queensland Naturalist," Vol. IX.,
p. 32.)

22. *Eucalyptus trachyphloia*, White Bloodwood.

DESCRIPTION.—Medium to large tree (in some situations flowering and fruiting as a shrub), the bark somewhat spongy and broken up into irregular tessellations. Young coppice shoots clothed with rather scattered stiff spreading hairs. Leaves on coppice shoots peltate or subpeltate, oblong to ovate, lanceolate, varying considerably in relation of length to breadth, up to 4 inches long and $1\frac{3}{4}$ inches wide, markedly paler on the under surface, veins and veinlets distinct, the midrib and principal nerves clothed on the under surface with scattered bristle-like hairs, leaf apex blunt and acute, base rounded or subcordate. Ordinary (secondary or adult) leaves straight and falcate, narrow-lanceolate, apex acute, often finely drawn out towards the ends, rather coriaceous in texture, green and often rather glossy above, paler and more opaque beneath; petiole and leaf-stalk about $\frac{1}{2}$ inch long, blade mostly about 3 inches long and $\frac{1}{2}$ inch wide, but varying somewhat both in length and width; lateral nerves parallel and close together, but indistinct particularly in the more coriaceous leaves, intramarginal vein very close to the



WHITE OR BROWN BLOODWOOD.
Eucalyptus trachyphloia,
Sunnybank, near Brisbane.

Photo: Department Agriculture and Stock.

edge, sometimes easily seen under a lens, at other times indistinguishable from the thickened and slightly recurved leaf-margin. Flowers in umbels, the umbels in panicles, the panicles terminal and in the upper leaf axils. Individual umbels 3-7 flowered, peduncle angular. $\frac{1}{4}$ inch long, calyx tube broadly turbinate, somewhat shorter than the pedicel, pedicel and calyx tube together about $\frac{1}{4}$ inch or a little longer, operculum short, depressed-hemispherical, stamens in several series, all fertile, longer filaments 2 lines, anthers dehiscing by longitudinal parallel slits. Seed capsules urn shaped about $\frac{1}{4}$ inch in diameter, valves very deeply sunk.

DISTRIBUTION:—New South Wales and Queensland. The northernmost record is Staunary Hills, the westernmost, Chinchilla.

COMMON NAME:—White Bloodwood and Yellow Bloodwood are common vernaculars. The Queensland Forest Service has adopted Brown Bloodwood as the trade name of the timber.

BOTANICAL NAME:—*Eucalyptus* (see under No. 1.) *trachyphloia* from the Greek *trachys* rough, and *phloios* bark.

TIMBER:—The timber is used for house blocks and mining props and slabs. It is much freer from gum-veins than its ally, the Red Bloodwood, and on this account is more suitable as sawn timber.

BOTANICAL REFERENCE:—*Eucalyptus trachyphloia*, Ferd. von Mueller in Journal of Proceedings of the Linnean Society, III., 90, (1858).

AN AUSTRALIAN PLANT IN THE BERMUDAS.

So many of our weeds, such as Lantana, Star Burr, etc., have come from tropical America that it is interesting to learn from a paper, "Notes on the Flora of the Bermudas," by A. B. Rendle, in the Journal of Botany, for February, 1936, that the Australian *Jasminum simplicifolium*, introduced into the Bermudas about 1840, forms a dense jungle in the Bermuda forests, killing out the undergrowth and throttling the trees, into which the long branches climb. It has converted in parts much of what remains of the original vegetation into an almost impenetrable jungle. This vine is common in parts of Queensland, but nowhere, so far as I know, can it be called a pest.—C. T. White.

IRON AS THE BASIS OF LIFE.

Mr. W. D. Francis, Assistant Government Botanist, Brisbane, continues his work on the above subject, his latest and fifth paper being entitled "Iron as the Original Basis of Protoplasm: The Generation of Life in Space and Time." The author is to be congratulated on his scientific keenness and boldness in publishing this series of papers at his own expense, only the first two having appeared in the Proceedings of the Royal Society of Queensland. Several of the conclusions arrived at in the present paper follow logically on statements and indications contained in the fourth contribution.

As a result of microscopic observations, microchemical tests and photomicrographs of protoplasmic structures it is shown, remarks the author, that there are numerous similarities in the minute structure of protoplasm and the iron hydroxides. It is concluded that iron is the original basis of protoplasm. The fundamental factors in the origin of the iron bacterium *Leptothrix* from inorganic material are (1) the arrangement of iron atoms in ferrous hydroxide, (2) the processes of aggregation and crystallisation of ferrous hydroxide, (3) the chemical affinities of ferrous hydroxide for the groups of elements containing the protein elements, and (4) the ability of ferrous hydroxide to function in oxidation-reduction processes. These four fundamental factors are also the fundamental factors in the generation of life. The generation of life is a process which functions in many different parts of the tropical and temperate zones of the earth at present.

In conclusion, the author makes a strong appeal for serious work to be carried out on the generation of life, which he regards as an urgent necessity if we are ever to elucidate the causes of the diseases and disabilities to which animals and plants are subjected. This journal wishes Mr. Francis success in his investigations.—Ed.

THE GARDENS
and
the people